Environs

DOCUMENTATION ON ENVIRONMENTAL INFORMATION

Edited by

TARAK MOHAN DAS

COMMUNITY HEALTH CELL
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COMMUNITY HEALTH CELL

Environs

VOLUME I

FIRST EDITION

1984

ENVIRONMENTAL AWARENESS PROGRAMME

Under

INTEGRATED ECO-DEVELOPMENT PROJECT ON RIVER GANGA BASIN

At

CALCUTTA UNIVERSITY

Sponsored by

DEPARTMENT OF ENVIRONMENT GOVERNMENT OF INDIA

Life Science Centre
Calcutta University
35, Ballygunge Circular Road
Calcutta-700 019

Edited by
T. M. Das

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First Edition

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PREFACE

The book is published with a view to generate environmental awareness in general by utilizing existing resources and available indigenous talents in the field of environment. We hope, the various information provided in the book and the mailing addresses of different agencies will bridge the gap among different Non Governmental Organizations (NGO), Institutes, Societies and Science Clubs and help them know each other and develop long term exchange relation, effective interaction and active co-operation amongst all concerned.

The subject matter of the book is divided into 9 Parts in 2 Volumes. While Part 1 gives the list of agencies, Part 2 of the present Volume consists of lists of Movie Films and Video Cassettes on environmental topics. In view of the majority of the cliental (70%) being illiterate, the mass propagation of the powerful medium of Movie Films in our country is not only desirable but seems to be a must. But unfortunately this medium is being poorly used and is almost awfully abused. A radical change towards the present concept and practice of using Movie Films in our country is now imperative.

The book is published as a part of the programme of Environmental Awareness under the Intergrated Eco-development Project on river Ganga basin at the Calcutta University sponsored by the Department of Environment, Government of India. All the two volumes will be circulated free of cost to those organizations who are actively engaged in the study of the environment. The various lists published in the book are, however, not exhaustive ones. These will be continuously updated in subsequent editions and in this effort an active co-operation from the readers is earnestly solicited.

During writing up of this book I have received unreserved help, valuable advice and incessant encouragement from two of my co-investigators of the Project, Prof. K. G. Bagchi and Dr. N. C. Dutta which I treasure very much. Brilliant assistance also was received from our first batch of students of M. Phil Course in Environmental Science, namely : Sm. Soma Banik, Sri Tarakdas Basu, Sri Susanta Chakraborty, Sm. Suchismita Dev, Sri Avijit Guha, Sri Asit Baran Mandal, Sm. Patralekha Mukherjee, Sri Sankar Nandi, Sri Tapan Kumar Poddar, Sm. Sutapa Saha, Sm. Rita Saha, Sri Sagarmoy Saha and Sri Tapan Saha. I would also like to express my sincere thanks to the Department of Environment, Government of India for sponsoring the entire programme. Thanks are also due to various agencies and individuals, specially to Sri S. K. Bagchi of Birla Industrial and Technological Museum and Sri Nirmalyabaran Jana for active co-operation and help.

T. M. Das

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PART I

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180. Mr. V. P. Agarwala, Society for Promotion of
Waste land Development, Forestry Advisor
6, Sunder Nagar, New Delhi-110023

181. Dr. K. Sreekumar, General Secretary,
Society for the Protection of Environment (Kerala)
Binoy Vista, Cheyayyur, Calicut, Kerala-673017

182. Mrs. B. Sugathakumari, Secretary, Society for the
Conservation of Nature, (Prakriti Samarkshana Samiti)
Varada Nanda Vanam, Trivandrum-695001, Kerala

183. Shri A. K. Roy, Shahdol Group, C/o. Vidushak Karkhana
Anuppur, District Shahdol-484224

184. Prof. M. Kalander, Secretary,
Society of Environmental Services and Research Group
for Youth (India), No. 12, 11th Street,
Lourduswamy Colony, Near Bharati Dasan University,
V.C's Office, Tiruchirapalli-620023

185. Prof.Sh afeeq Naqvi,
Society for Services in the Himalayas,
Himalaya Sewa Sangh, Rajghat Colony, Delhi-110002

186. Dr. N. Keshosingh, Science Teachers Forum,
Manipur Keishampet, Madhavaban,
Imphal-795001

187. The Secretary,
Scientific Workers Forum, Calcutta

188. Dr. S. B. Chapekar, Joint Secretary,
Society for Clean Environment, Garden Resort,
606, E. Scion Trombay Road,
Chembur, Bombay-400007

189. Secretary,
Society for Plant Physiology and Biochemistry,
Room No. 306, Nuclear Research Laboratory,
Indian Agricultural Research Institute,
New Delhi-110013

190. General Secretary, Society of Indian Foresters,
Dehradun, New Forest-248006, U.P.

191. President, Students Environmental Club,
Department of Zoology, M. B. College, Udaipur,
Rajasthan

192. Secretary, Save a Tree in Your Area, (SATYA),
D 1/151, Satya Marg, Diplomatic Enclave,
Chanakyapuri, New Delhi-110021

193. Coordinator,
Society of Appeal for Vanishing Environment,
The Retreat, Bhimtal-263136, U. P.

194. Secretary, Society of Environment Engineers,
L.R.D.E., Bangalore

195. The Secretary, The Science Association of Bengal,
104, Diamond Harbour Road,
Barisha, Calcutta

196. Shri Panna Lal Dasgupta, Secretary,
Tagore Society for Rural Development,
14, Khudiram Bose Road,
Calcutta-700006

197. The Secretary, Tribal Documentation Centre,
Gutusai Chaibasa, Singhbhum District, Bihar

198. Mr. P. A. Joseph, Secretary,
Thekkadi Wild Life Society,
Kumity P.O., Kerala-685509

199. Dr. L. L. Sharma, Secretary General,
Udaipur Environmental Group, Environmental Cottage,
206, Ashok Nagar, Udaipur-313001, Rajasthan

200. Shri Vijay Narain, Udaipur Environmental Action
Group, Assistant Professor of Zoology,
School of Basic Science & Humanities,
University of Udaipur, Udaipur-313001,
Rajasthan

201. Director, Urban Environment Institute,
181, Rewa Haji Ali, Bombay-400026

202. Information Officer, Van Sharamik Sahakari Samiti,
P.O. Manan, District Almora, Kumaon Hills, India

203. The President, Wildlife Conservation Society,
Bhav Vilas, Bhavnagar, Gujarat

204. Shri U. K. Gopalan, Secretary,
Working Group on Environmental Protection,
Cochin Science Association,
XLVI/1429 S.R.M. Road, Cochin,
Kerala-682018

205. Mr. P. V. Thomas, Wards of Indian Nature,
Puthenpura House, P.O. Kumily District, Idukki, Kerala

206. Prof. Dilip Bose, World University Services,
Jadavpur University Unit, Calcutta-700032

207. The Administrator, World Wild Life Fund (India)
Great Western Building, 1st Floor,
Shahid Bhagat Singh Road, Bombay-400023

208. Chief Executive, Wildlife Association of South India,
49, Richmond Road, Bangalore-560026

209. Hon. Secretary, Wildlife Conservation Society,
6-1-471/C-30, Behind Library, Khairatabad,
Hyderabad, A. P.-500004

210. The Secretary, Wild Life Preservation Society of India, 6-Astley Hall, Dehradun, U. P.

211. Shri M. A. Parthasarthy, World Wild Life Fund, Southern Region, Hamsini, 12th Cross, Rajmahal Extension, Bangalore-560006

212. The Secretary, Youth Ecological Society of India, Ecological Section, Department of Botany, MS University of Baroda, Baroda-390007

213. Mr. Dalip Yardi, Youth Environmental Action Group, Youth Hostel, Padampura, Aurangabad-431001

214. Dr. Ashok Mittal, Youth & Environment, A-136, Saraswati Vihar, Delhi-110034

215. Dr. Pran K. Bhatt, Youth and Biosphere, Department of Limnology, Bhopal University, Bhopal, M. P.-462026

216. John S. Jacob, Zoological Club, Payyanur College, Edat P.O., Kerala-670327

217. Dr. A. K. Patra, Zoological Society of Orissa, Zoology Department, G. M. College, Sambhalpur-788004

Additional List of Non-Government Organisations/ Registered Societies.

218. Dr. V. P. Kudesia, Academy of Environmental Sciences C-30, Shastri Nagar, Meerut-1, U.P.

219. Shri Murad K. Faize, Director, Blue Skies, 28 K, Dubesh Marg, Bombay-400023

220. Dr. R. S. Thakore, Gujarat Science Academy, Physical Research Laboratory Navrangpura, Ahmedabad-380009

221. Prof. K. S. Swami, Indian Society for Comparative Animal Physiology, Department of Zoology, S. V. University, Tirupati-517502

222. Shri N. Dasgupta, Secretary, Indian Society of Engineers, 12-B, Netaji Subash Marg, Calcutta-700001

223. The Secretary, Indian Society for Himalayan Studies,
Rengco Campus, Hazratbal,
Srinagar-190006

224. The Secretary, Kashmir Environmental Society,
Ecology Laboratory, Department of Botany,
University of Kashmir, Srinagar

225. Dr. N. Parthasarathy, Madras Science Foundation,
86, N. K. Amman Koil Street,
Mylapore, Madras-4

226. Shri V. N. Kak,
Rajasthan Environmental Preservation Society,
Vasundhra, Tonk Road, Jaipur, Rajasthan

227. Ms. Mariam Modi, Convenor
Save Mahabaleshwar Panchgani Society,
Stone House, Mahabaleshwar-412806

228. Shri Sewak Sharan,
Sri Brindawan Swaroopothan Paribhawana,
Srihit Sewak Sadan, Attakamba
Sri Vrindawan-281121

229. The Secretary, Wind Energy Society of India,
D-409, Defence Colony,
New Delhi-110024

230. Shri Samar Singh, Chairman,
High Range Game Preservation Association,
Neti Gudi Estate, Munnar-605612, Kerala

231. Smt. Radha Bhatt, Secretary,
Kasturba Mahila Uthan Mandal Kasauni,
Lakshmi Ashram, Kasauni-263639, U.P.

232. Shri Sunderlal Bahuguna,
Bhartiya Navajivan Mandal,
Village Silyara (Via Ghansai), Tehri-249001, U.P.

233. Shri M. S. Simpana, Agrarion Centre,
2, Lal Bagh Road, Bangalore-560001, Karnataka

234. Shri Madhav Gadgil, Technical Coordinator,
Elephant Task Force, Centre for Theoretical Studies,
Indian Institute of Science,
Bangalore-560001, Karnataka

235. Shri P. V. L. N. Rao, General Manager,
Natural Resources Development Cooperative
Society Limited
3-5-886/4-A, University Road, Hyderabad-500009
Andhra Pradesh

236. Dr. D. N. Sen, Reader in Ecology, GEOBIOS
P.O. Box No. 14, University of Jodhpur,
Jodhpur-342001, Rajasthan.

237. Mr. J. S. Patel, Director,
Gokhale Education Society's Agricultural Institute,
Kossad Hill-400173, Maharashtra

238. Prof. M. L. Dantwala, President,
Indian Society of Agricultural Ecologies
46-48, Esplanade Mansions
M. G. Road, Bombay-400023, Maharashtra

239. Sri Kashyap Mankodi, Sarvodaya Centre, Pindval,
Opp. First Gate, Atul-396020 Gujrat

240. Shri A. Bhargava, Convenor
MEDICO Friends Circle (MFC)
21, Nirman Society, Vadodara-390005, Gujrat

241. Mrs. Vidya, Manager, SHRAMBHARATI
Khadi Gram, Monghyr-811201, Bihar

242. Dr. Jayanarayan Jayaswal,
Dr. Jayaranarayan Nature Cure Centre
Hindustan Colony, Amarasti Road,
Nagpur-440002, Maharashtra

243. Shri P. M. Poddar, Coordinator,
Shri Aurobindo Society, Society House,
Pondicherry-605002

244. Shri B. Haragopala Rao, Coordinator,
Environment Study Group, Benaras Hindu University,
Varanasi-221005, U.P.

245. Dr. B. Prakash, Convenor and Executive Director,
Vigyan Shiksha Kendra (VSK), Attarra-210201, U.P.

246. Shri L. C. Tyagi, Office Secretary,
Banwasi Sewa Ashram, Govindpur,
Mirzapur-231001, U.P.

247. Shri A. M. Muddie, President, Himalayan Club,
W-13, Greater Kailash-1, New Delhi-110048

248. Shri C. Ramachandran, Honorary Director,
The Gandhi Gram Rural Institute
Gandhigram, Madurai-624302, Tamil Nadu

249. Dr. A. S. Vyas, Gujarat Environmental Action Group,
Department of Botany, Gujarat University,
Ahmedabad-380001

250. Shri D. K. Bhatt, President, Students Environment
Club, M.B. College, Department of Zoology,
Udaipur-313001, Rajasthan

251. Shri Rajendra Kumar, Secretary,
Students Environmental Action Group,
Commerce Department, Government College,
Bhilwara-311001, Rajasthan

252. Ms. Sushila Sharma, Secretary,
Mahila School Club for Environmental Action,
Mahila Mandal, Udaipur-313001, Rajasthan

253. Prof. R. Misra, Indian Environmental Society,
Action Group in Varanasi, Department of Botany,
Benaras Hindu University,
Varanasi-221005, U.P.

254. Dr. S. Chandra, Scientist in Charge of Palynological
Section, Bose Institute,
93/1 A.P.C. Road, Calcutta-700009, West Bengal

255. Secretary, Allahabad Youth Forum for Environmental
Studies and Conservation, Department of Botany,
University of Allahabad, Allahabad-211002, U.P.

256. Secretary, Botany Environmental Action Group,
Department of Botany, Institute of Science,
Madam Cama Road, Bombay-400032, Maharashtra

257. Secretary, Jaipur Environmental Association,
Department of Botany, University of Rajasthan,
Jaipur-302004, Rajasthan

258. Secretary, Moradabad Evironmental Action Group,
Department of Botany, Hindu College,
Moradabad-244001, U.P.

259. Shri Khanak V. Parekh, Hon. State Director,
All India Gram Sahyog Samaj,
36 Karanpara, Meghji Wala Building, Rajkot-Gujarat

260. Dr. Tarak Kate, Secretary, Wardha Nisarga Mandal,
Dr. Gopalrao Bhalerao Lane, Socialist Square,
Wardha-442001

261. Shri Sundara Narayana Patro, Secretary,
Orissa Environmental Society,
P.O. Nuvapada, Ganjam-761011

262. Shri S. K. Patnaik, Hon. Secretary,
Nature and Wildlife Conservation Society of Orissa,
145, Shaheed Nagar, Bhubaneshwar-Orissa

263. Dr. Vivek Paranjape, President,
The Friends of Animals Society,
13, Parijat, Behind Peshawa Park, Pune-411030

264. Dr. G. S. Yonzone, General Secretary,
Himalayan Science Association, Darjeeling
Flat 4, Valima Cottage, Hooker Road,
Darjeeling-734101

265. Dr. A. R. Subramaniam, Secretary & Treasurer
Indian Agro Meterological Society,
Department of Meteorology and Oceanography
Andhra University, Waltair-530003

266. Shri J. K. Mishra, Secretary, Vaanaspatik Club,
Department of Botany,
Sri Jai Narain Degree College, Lucknow-226001

267. Shri D. C. Dhar, Secretary, Meghalaya Science Society,
Jess Cott. Lower New Colony, Shillong-793003

268. Dr. L. S. Venkataraman, Director,
Institute for Social and Economic Change,
Nagarbhavi P.O., Bangalore-560072

269. Mr. R. Jagadisan, Registrar,
Institute for Techno-Economic Studies,
76, Harrington Road, Madras-600031

270. Prof. K. M. Kundnami, Secretary,
Bombay Institute of Environmental Technology,
124, Dinshaw Wacha Road, Bombay-400020

271. Shri Shiv Khare,
Youth and Family Planning Programme Council,
F-13, South Extension Part-I, New Delhi-110049

272. Dr. M. Y. H. Hakim, Director,
Sanjay Gandhi Institute of Environmental
Biology and Medical Entomology, Kashipur
Samashtipur-848101, Bihar

273. Mr. Sydney Rebeiro, President, CONVERSAZIONE
C 45, Jungpura Extension, New Delhi-110014

274. Shri Mahendra Singh Kunwar,
Dasholi Gram Swarajya Mandal, Mandir Marg,
Gopeshwar Market,
Gopeshwar, Distt. Chamoli, Uttar Pradesh-246401

275. Mr. Jamshed Bhabha, President, Friends of the Trees,
1/10, Tata Sons Private Limited,
Bombay House, Mody Street, Bombay-400001

276. Mr. Kisan Mehta, President, Save Bombay Committee,
123-M. G. Road, Bombay-400023

277. Mrs. Dilnavaz Variave, Save Silent Valley Committee,
C/o Bharat Tiles and Marbles Pvt. Ltd.,
32, Appollo Street, Bombay-400001

278. Mr. M. R. Pai, Forum of Free Enterprise,
"Tiramal Mansion", 3rd floor,
235 D. N. Road, Bombay-400001

279. Prof. Manubhai Shah,
Consumer Education and Research Centre,
Thakorebhai Desai Smarak Bhawan,
Near Law College, Ellisbridge, Ahmedabad-380006

280. Chairman, Asian Elephant Group, Hornbill House,
Shahid Bhagat Singh Road, Bombay-400023

281. Manager, Centre for Himalayan Resources
Investigation and Survey,
Old Post Office Building, Hrishikesh-24981, U.P.

282. Administrator,
Data Centre Natural Resources, W.W.F.(I)
18, Spencer Road, Fraser Town Post Office,
Bangalore-560005

283. Shri K. Narayan Nair, Centre for Development Studies, Ulloor, Trivandrum-695011

284. Co-ordinator, Institute of Development Studies, Leela Vihar, Manasa Gangotri, Mysore-570006

285. Secretary, Institute for Himalayan Studies and Regional Development, Garhwal University, P.O. Box 12, Srinagar-Garhwal

286. Editor,
International Journal of Ecology and Envtl. Science
C/o Department of Botany,
University of Rajasthan, Jaipur-302004

287. Secretary, Soil Conservation Society of India, Hazaribagh, Bihar-India

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Institutes and Organizations at Calcutta engaged in the Study of various aspects of Environmental Science and Life Science.

A

(Universities teaching Environmental Science)

1. Calcutta University M.phil Programme on Environmental Science

*Collaborating Departments**

(a) Life Science Centre (Collaborating Centre for running the Course),
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

(b) University College of Agriculture,
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

(c) Department of Anthropology,
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

(d) Department of Biochemistry,
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

(e) Department of Botany,
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

(f) Department of Geography,
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

(g) Department of Geology,
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

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*Further information regarding Regulation and Syllabus of the M.Phil course in Environmental Science is given in Part III.

(h) Department of Zoology,
35, Ballygunge Circular Road, Calcutta-700019
Phone : 47-3681

(i) Department of Applied Mathematics,
92, Acharyya Prafulla Chandra Road, Calcutta-700009
Phone : 35-9186

(j) Department of Chemistry,
92, Acharyya Prafulla Chandra Road, Calcutta-700009
Phone : 35-9186

(k) Department of Physics,
92, Acharyya Prafulla Chandra Road, Calcutta-700009
Phone : 35-1993

(l) Department of Physiology,
92, Acharyya Prafulla Chandra Road, Calcutta-700009
Phone : 36-9186

(m) University Service and Instrumentation Centre,
92, Acharyya Prafulla Chandra Road, Calcutta-700009
Phone : 35-9186

B

(Institutes dealing in Environmental Science and Life Science)

1. All India Institute of Hygiene and Public Health,
110, C. R. Avenue, Calcutta-700073,
Phone : 34-5271

2. Anthropological Survey of India,
27, Jawaharlal Nehru Road, Calcutta-700016,
Phone : 23-2853

3. American Centre,
7, Jawaharlal Nehru Road, Calcutta-700016,
Phone : 23-7411

4. Bengal Immunity Research Institute,
39, A. J. Bose Road, Calcutta-700017,
Phone : 24-2921

5. Bangiya Bijnan Parishad,
P-23, Raja Rajkrishna Street, Calcutta-700006,
Phone : 55-0660

6. Bhabha Atomic Research Centre,
Sec-1, BI-AF, Bidhan Nagar, Calcutta-700064,
Phone : 36-5207

7. Bidhan Chandra Krishi Visva Vidyalaya,
Mohanpore, Nadia, West Bengal

8. Birla Industrial and Technological Museum,
19A, Gurusaday Road, Calcutta-700019,
Phone : 43-5405

9. British Council, 5. Shakespeare Sarani,
Calcutta-700016, Phone : 44-5378

10. Bose Institute, 93/1, A. P. C. Road,
Calcutta-700009, Phone : 35-2402

11. Botanical Survey of India, Botanical Garden,
Howrah-3, Phone : 67-5357

12. Burdwan University, Burdwan, Calcutta Camp Office,
8, Indra Ray Road, Bhowanipur, Calcutta-700025

13. Calcutta Port Trust, 15, Strand Road,
Calcutta-700001, Phone : Phone : 22-3451

14. Central Food Laboratory, 3, Kyd Street,
Calcutta-700016, Phone : 24-8896

15. Calcutta Metropolitan Development Authority (CMDA),
3A, Auckland Place, Calcutta-700017, Phone : 22-1681

16. Central Drug Reserach Institute, 1, Kyd Street,
Calcutta-700016, Phone : 24-2406

17. Central Inland Fishery Research Institute,
Barrackpore, 24- Parganas, W. B. Phone : 53-0388

18. Center for Study of Man and Environment,
Geology Department, Presidency College,
Calcutta-700073, Phone : 34-1870

19. Chittaranjan National Cancer Research Centre,
37, S. P. Mukherjee Road, Calcutta-700026
Phone : 47-3045

20. Cultural Research Institute, P1/4, CIT Scheme VII,
VIP Road, Kankurgachi, Calcutta-700054

21. Calcutta Improvement Trust,
P-16, India Exchange Place Extn.,
Calcutta-700073

22. Corporation of Calcutta,
5, S. N. Banerjee Road, Calcutta-700013

23. C. P. W. D., Nizam Palace,
234/1, Acharya J. C. Bose Road, Calcutta

24. Department of Environment, Govt. of West Bengal,
Writers Buildings, Calcutta-700001,
Phone : 22-6016

25. Friends of Trees, Tata Centre, 14th Floor,
43, Chowringhee Road, Calcutta-700071,
Phone : 45-7165

26. Food Technology Department, Jadavpur University,
Raja S. C. Mullick Road, Calcutta-700032
Phone : 72-4044

27. Forest Department, Government of West Bengal,
Social Forestry Section,
P-16, India Exchange Place Extension,
Calcutta-700073, Phone : 26-5304

28. Geological Survey of India, 27, Jawaharlal Nehru Road,
Calcutta-700016, Phone : 23-3771

29. Indian Institute of Chemical Biology,
4, Raja S. C. Mullick Road, Calcutta-700032,
Phone : 46-9197

30. Indian Statistical Institute,
203, B. T. Road, Calcutta-700035,
Phone : 52-6694

31. Indian Museum,
27, Jawaharlal Nehru Road, Calcutta-700016,
Phone : 23-0742

32. Indian Institute of Environment and Ecological Sciences,
2A, Shakespeare Sarani, Calcutta-700017

33. Institute of Basic Medical Sciences,
244, A. J. Bose Road, Calcutta-700020,
Phone : 43-2036

34. Institution of Engineers (India), 8, Gokhale Road, Calcutta-700020, Phone : 44-8347

35. Jute Agriculture Research Institute, Nilgunge, Barrackpore, Phone : 53-0849

36. Jadavpur University, Raja S. C. Mullick Road, Calcutta-700032, Phone : 72-4044

37. Kalyani University, Kalyani, Nadia, Phone : Kalyani-220

38. Ministry of Education & Culture, National Service Scheme, Zonal Center II (NSS) E.Z., 25B, Park Street, Calcutta-700016

39. National Environmental Engineering Research Institute, 23, R. N. Mukherjee Road, Calcutta-700001, Phone : 23-8792

40. National Atlas Organization, 50A, Gariahat Road, Calcutta-700019, Phone : 47-9924

41. National Library, Belvedere, Alipore, Calcutta-700027, Phone : 45-5381

42. National Sample Survey Organization, SDRD & DPD Divisions (Hd. Qrs.), 25A, Shakespeare Sarani, Calcutta-700017, Phone : 44-8389

43. National Bureau of Soil Survey & Land Use Planning (ICAR), 23, Netaji Subhas Chandra Bose Road, Calcutta-700047, Phone : 24-9172

44. National Test House, 11/1, Judges Court Road, Calcutta-700027, Phone : 45-9231

45. Netaji Institute for Asian Studies, 1, Woodburn Park, Calcutta-700020, Phone : 43-3160

46. North Bengal University, Raja Rammohanpur, Dist. Darjeeling, Calcutta Camp Office, P-251/2A, S. P. Mukherjee Road, Calcutta-700026, Phone : 22-4654 & 41-1609

47. Public Works Department, S. E. Presidency Circle, New Secretariate Building, Calcutta-700001

48. Ramkrishna Mission Institute of Culture, Golpark, Calcutta-700029, Phone : 46-3431

49. Science Association of Bengal, 104, Diamond Harbour Road, Barisa, Calcutta-700008

50. School of Tropical Medicine, Chittaranjan Avenue, Calcutta-700073, Phone : 34-1862

51. Visva Bharati, Santiniketan-731235, West Bengal

52. West Bengal Prevention and Control of Pollution Board, Industry House, 2nd Floor, 10, Camac Street, Calcutta-700017

53. West Bengal Smoke Nuisance Directorate, 60B, Chowringhee Road, Calcutta-700020, Phone : 44-0232

54. West Bengal Smoke Nuisance Observatories, New Secretariate Buildings, Calcutta-700001, Phone : 23-6271

55. Zoological Survey of India, 34, Chittaranjan Avenue, Calcutta-700012, Phone : 27-0202

C

(Learned Societies at Calcutta dealing in Environmental Science and Life Science)

1. Asiatic Society, 1, Park Street, Calcutta-700016, Phone : 24-0539

2. Agricultural Society of India, 35, Ballygunge Circular Road, Calcutta-700019

3. Bird Watchers Society of Bengal, 8, Lindsay Street, Calcutta-700016

4. Botanical Society of India, Botanical Garden, Howrah-3.

5. Botanical Society of Bengal, 35, Ballygunge Circular Road, Calcutta-700019

6. Explorer's Club of India, 10, Govt. Place (East), Calcutta-700001.

7. Geographical Society of India, 35, Ballygunge Circular Road, Calcutta-700019

8. Geological, Mining and Metallargical Society of India, 35, Ballygunge Circular Road, Calcutta-700019

9. Hemboldt Club, Max Mueller Bhavan, 8, Pramathesh Barua Sarani, Calcutta-700019

10. Institute of Landscape, Ecology and Ekistcs. 35, Ballygunge Circular Road, Calcutta-700019

11. Indian Anthropological Society, 27, Jawaharlal Nehru Road, Calcutta-700016.

12. Indian Association of Biological Sciences, Life Science Centre, 35, Ballygunge Circular Road, Calcutta-700019

13. Indian Chemical Society, 92, A. P. C. Road, Calcutta- 700009

14. Life Science Teacher's Association, Life Science Centre, 35, Ballygunge Circular Road, Calcutta-700019

15. Physiological Society of India, 92, A. P. C. Road, Calcutta-700009

16. Prakiti Sansad, 206, Harish Mukherjee Road, Calcutta-700026

17. Pran O Paribesh, Botany Deptt. University College of Science 35, Ballygunge Circular Road, Calcutta-700019

18. School of Fundamental Research, 18, Mustaque Ahmed Street, Calcutta-700029

19. S. Calcutta Youth Hostel Asso., 77, Southern Avenue, Calcutta-700029

20. Unnayan, 36/1A, Garcha Road, Calcutta-700019

21. Vivekananda Nidhi, 86F, Monoharpukur Road, Calcutta-700029

22. World Wildlife Fund—India,
43, Chowringhee Road, (1st Floor),
Tata Centre, Calcutta-700051

23. Wild Life Preservation Society of Eastern India,
Rafi Ahmed Kidwai Road, Calcutta-700073

24. Womens Voluntary Service, C/o Green Door,
34, Rowland Road, Calcutta-700019

25. Zoological Society, 35, Ballygunge Circular Road,
Calcutta-700019

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PART II

Movie Films on Environmental Science and Life Science available at different Institutes and Organizations.

Name of the Institution : Life Science Centre, Calcutta University

Address of the Institution : 35, Ballygunge Circular Road, Calcutta-19

Person with whom correspondence should be made : Prof. T. M. Das

List of Films

Services of Trees

16mm. 11mins. Colour. English, Bengali & 13 other Indian languages. Producer : Films Division. This film depicts the indispensable role of Trees in controlling the delicate balance in nature and services to mankind. Theme and technical expertise : T. M. Das.

Cell Division

16mm. 20mins. Colour. Silent English subtitle. Cine-photomicrographic study with Interference-microscopy of Mitosis at different temperatures of the medium. Producer : T. M. Das, A. C. Hildebrandt and A. J. Riker, Wisconsin University, U.S.A.

The Dynamic Activities of TMV Virus Crystals in a living Tobacco Leaf-hair Cell

16mm. 15mins. Colour. Silent English subtitle. Cine-photomicrographic study with Interference-microscopy of an isolated leaf-hair cell of tobacco infected with RNA Tobacco Mosaic Virus. Producer : T. M. Das, Naresh Chandra, A. C. Hildebrandt. Wisconsin University, U.S.A.

Absorption of Particulate Pollutants by Leaf-hair Cells of Plants. Transport of Macro-molecules through Membrane. Displacement of Nucleus by Physical stress

16mm. 15mins. Colour. Silent, English subtitle. Cine-photomicrographic study with Interference-microscopy of an isolated cell in which above phenomena have been depicted. Producer : T. M. Das, A. C. Hildebrandt and A. J. Riker, Wisconsin University, U.S.A.

The Dynamic Activities of a living Cell with variation of Temperature and age

16mm. 20mins. Colour. Silent, English subtitle. Cine-photomicrographic study with Phase and Interference microscopy of an isolated cell. Producer : as above.

The Life and Death of a Cell

16mm. 20mins. Black & White. Silent, English sub-

title. Cine-photomicrographic study of a living and dying cell exposed to low temperature. Producer : as above.

Snakes and Snake-Park

16mm. 23mins. Colour. English. A wonderful film on various poisonous and non-poisonous snakes of India. Their habits and habitats and role in the food chain. Snake-bite treatment and role of snake-park. Producer : Saraswaty Nilayam, Madras-600024.

National Parks, Gardens and Cities of West Coast—U.S.A.

8mm. 60mins. Colour. Silent. Grand Canyon National Park, Yellow Stone National Park, Salt lake, Disneyland, Marine land, San Francisco, Los Angeles, Denver, Rockey Mountain, Chicago. Producer: T. M. Das.

Niagara Falls, Cities and University Campus of East Coast—U.S.A.

8mm. 60mins. Colour. Silent. Niagara Falls, New York city, Purdue University Campus, Pennsylvania State College Campus. Flowers of spring and autumn. Producer: T. M. Das.

Winter at Wisconsin

8mm. 60mins. Colour. Silent. Life activity in an environment when outside temperature is −20°C. The whole lake is frozen into ice, Ice-hockey and other winter sport on the lake. Fishing through the ice. Flowers of early spring. Producer : T. M. Das.

World Fair, Paris and Switzerland

8mm. 60mins. Colour. Silent. A colourful film on World Fair, Paris and Switzerland. Producer : T. M. Das.

35mm Colour Slides on

Principles of Strategy of Survival in Nature

Plants and Pollution

Indian Environment and Pollution

Pollution and Evolution

Air Pollution

Water and Life

Endangered Plants

Aging and Senescence

Value of the Tree

Living Himalayas

Terms of hiring and other facilities

Which films are available on loan basis : All as per list.

Security deposit if any : Nil, Films are to be accompanied by our staff.
Projector and Projectionist : Projector not available. Projectionist available.
Cost of hiring at Calcutta : Nil, T.A. & D.A. of the staff to be paid.
Cost of hiring outside Calcutta : Nil, T.A. & D.A. of the staff to be paid.

●

Name of the Institution : Zoological Survey of India.
Address of the Instituation : 27, Jawaharlal Nehru Road, Calcutta-700016
Name of the person to be contacted : Director, Attn. Dr. D. K. Kackar, Superintending Zoologist.

List of Films

Gir Forest

16mm. 10mins. Silent. colour.

Taxidermist and his Art

16mm. 24mins. Sound. B. W.

Bird Skining Taxidermist (1)

16mm. 10mins. Silent. colour.

Bird Skining Taxidermist (2)

16mm. 12mins. Silent. colour.

Fishing Method in Kashmir, Dal Lake.

16mm. 10mins. Silent. colour.

Life cycle of a Frog.

16mm. 12mins. Sound. (B.W.) English.

Animal of Back Bone

16mm. 10mins. Sound. (B.W.) English.

World of Water

16mm. 12mins. Sound. colour. English.

Indian Elephant

16mm. 12mins. Silent. colour.

Kazi Ranga National Park

16mm. 10mins. Silent. colour.

Manas Sanctuary

16mm. 8mins. Silent. colour.

Nesting Time

16mm. 8mins. B.W.

Hailey National Park

16mm. 10mins. Sound. colour, English.

Kanha National Park

16mm. 10mins. Sound. colour, English.

Locomotion of Snakes

16mm. 12mins. Sound. colour, English.

Introducing the Reptiles

16mm. 12mins. Sound. colour, English

Terms of hiring and other facilities

Which films are available on loan basis : All as per list.
Security deposit if any : Nil.
Projector / Projectionist available : May be made available if not otherwise occupied.
Cost of hiring at Calcutta : Nil. (Outside Calcutta TA / DA of staff to be paid)
Any other relevant information : Films are to be accompanied by staff of Photography Section, Z.S.I. Overtime allowances for staff to be paid by agency using the films.

●

Name of the Institution : Chief Conservator of forests, West Bengal
Address of the Institution : P 16, India Exchange Place Extn., 3rd floor, Calcutta-700073
Person with whom correspondence should be made : as above

List of Films

Dooars, lovely Dooars

16mm. 22mins. Col. Bengali

Bamboo

16mm. 20mins. Col. Music only

Social forestry

16mm. 10mins. Col. Bengali

The ravaged elements

16 mm. 11mts. Col. English

Tropical Wilderness

16mm. 15mins. Col. English

Big horn

16mm. 10mins. Col. English

Our forests

35mm. 20mins. Col. Bengali

Terms of hiring and other facilities

Which films are available on loan basis : All films mentioned above
Security deposit if any : Nil
Projector/Projectionist : Not available
Cost of hiring at Calcutta : Nil
Outside Calcutta : Nil
Any other relevant information : The films are available only at the time when those are not required for the Forest department.

●

Name of the Institution : French Cultural Centre
Address of the Institution : 24 Park Mansions, Park Street, Calcutta-700016
Person with whom correspondence should be made : Film Librarian

List of Films

Making Ends Meet (4BAI)

16mm. 13mins. B.W. English

L Aigrette Garzette (4BA 2)

16mm. 9mins. coloured English

Les Manchots Empereurs (4BAI 4)

16mm. 15mins. B.W. French

Le Livre des oiseaux (4BAI 5)

16mm. 20mins. Col. English

Le Dragon du Komodo (4BAI 7)

16mm. 15mins. coloured French

Images Des Mondes Perdus (4BAI 10)

16mm. 14mins. coloured French

Terms of hiring and other facilities

Which films are available on loan basis : All of them
Security deposit if any : Nil
Projector/Projectionist available : Not available
Cost of hiring at Calcutta : Nil
Outside Calcutta : Rs. 70.00 (only if to be sent by post)
Any other relevant information : None

Name of the Institution : Indian Statistical Institute
Address of the Institution : 205, B. T. Road, Calcutta-700035
Person with whom correspondence is to be made : R. L. Brahmacharya, Sukhendu Ghose

List of Films

About 200 Films from IWF, Germany are available as a partial archive of IWF

Embryonic development in the Snail

16mm. Colour. 10mins.

Hydra

16mm. Colour. 8mins.

Rotifer

16mm. Colour. 4mins.

Vorticella

16mm. Colour. 4mins.

African Wild Life

8mm. Colour.

Andaman Marine Organisms

8mm. Colour

Which films are available on loan basis : All the films as per list
Projector/Projectionist available : Not available

●

Name of the Institution : Birla Industrial and Technological Museum.
Address of the Institution : 19A, Gurusaday Road, Calcutta-700019
Person with whom correspondence should be made : The Director.

List of Films

Life cycle of a pinmold

16mm. 10mins. Black-white English

Life in a drop of water

16mm. 11mins. B.W. English

Beginning of Life

16mm. 21 mins. Col. English

Embroynic development of the chick

16mm. 26mins. Col. English

Heredity and Parental Development

16mm. 21mins. B.W. Bengali

Genetics : Functions of DNA and RNA

16mm. 12mins. B.W. English

Use of Forests

16mm. 11mins. B.W. English

Who lives here

16mm. 21mins. Col. English

Colour of Life

16mm. 24mins. Col. English

Flowers of the hive

16mm. 11mins. B.W. English

A tree is a living thing

16mm. 11mins. Col. Hindi

How trees live

16mm. 16mins. B.W. English

About Flowers

16mm. 10mins. Col. English

Climbing Plants

16mm. 14mins. Col. English

Photosynthesis : Chemistry of food making

16mm. 14mins. Col. English

Reptiles and their characters

16mm. 14mins. Col. English

Birds and their characters

16mm. 11mins. B.W. English

Fish and their characters

16mm. 11mins. B.W. English

Snakes

16mm. 11mins. B.W. English

A day at zoo

16mm. 11mins. B.W. English

Grasshopper : a typical insect

16mm. 5½mins. B.W. English

Honey bee : a social insect

16mm. 5½mins. B.W. English

Island of Turtle

16mm. 8mins. Col. English

Swan's lake

16mm. 15mins. Col. English

Where the deer roam

16mm. 21mins. Col. English

Chameleon

16mm. 8mins. Col. English

World in a marsh

16mm. 20mins. Col. Hindi

Conquered Instinct

16mm. 21mins. B.W. English

Making of balanced acquarium

16mm. 11mins. B.W. English

Zoo Babies

16mm. 11mins. Col. English

Crocodile hunters

16mm. 10mins. B.W. English

Silver thread

16mm. 17mins. B.W. English

Language of the bee

16mm. 15mins. Col. English

What's under the ocean

16mm. 14mins. B.W. English

Introducing insects

16mm. 16mins. B.W. Hindi

Secrets of the bee world

16mm. 15mins. Col. English

Secrets of the ant and the insect world

16mm. 15mins. Col. English

Secret of the underwater world

16mm. 15mins. Col. English

Birds and their home

16mm. 10mins. Col. English

Deer family

16mm. 20mins. Col. English

Small animals of the plain

16mm. 20mins. Col. English

Among fish

16mm. 11mins. Col. English

Buffalo : majestic symbol of the plain

16mm. 11mins. Col. English

Butterfly mystery

16mm. 10mins. Col. English

Waterfowl : a resource in danger

16mm. 10mins. B.W. Hindi

Wildlife in the rockies

16mm. 10mins. B.W. Hindi

Butterfly

16mm. 8mins. Col. English

I'm a mammal and so are you

16mm. 4mins. Col. English

Jakies visit the zoo

16mm. 11mins. B.W. English

Origin and evolution of man

16mm. 24mins. B.W. English

Annals of Life

16mm. 21mins. Col. English

How a virus kills

16mm. 33mins. B.W. English

Life

Super 8mm. 15mins. B.W. English

Environmental Science

Paradise lost

16mm. 5mins. Col. Music only

Other World

16mm. 22mins. Col. English

How green plants make and use food

16mm. 13mins. B.W. English

Colour slides 35mm.

Vanishing forests

91 slides with commentary on cassette tape

A blue print for survival

77 slides with commentary on cassette tape

We do not hire or lend films. The stock maintained by us is for the use of this musuem and its mobile and district units.

●

Name of Institution : Department of Information & Cultural Affairs, Government of West Bengal
Address : Writers Buildings, Calcutta-700001

List of Films

Agriculture & Food

Bristi Chhara Fasal Fale

35mm. 2000ft. 20mins.
The film shows that we get sufficient crops with the help of pump sets in rural areas

Ekti Rutir Kahini

35mm. 255ft. 22mins.
A Quickie on wastage of food

Dhan Chaser Pragati

35mm. 1015ft. 10½mins.
Better cultivation of paddy in West Bengal

Laksha Chaser Katha

35mm. 1015ft. 10½mins.
Lac cultivation showing the beginning stages

Secher Nutan Utsa

35mm. 1015ft. 10½mins.
Deep tube-well irrigation

Sashaydi Rakshan

35mm. 1015ft. 10½mins.
Activities of the State Agricultural Research Centre

Unasattarer Chasi

35mm. 1340ft. 19½mins.
On cultivation & land ownership of the farmer

Animal Husbandary and Dairy Development

Godhaney Haiba Dhani

35mm. 1062ft. 12mins.
On cattle development

Ankurey Binash

35mm. 16mm. 1015ft.
10½mins.
Cattle care and mobile veterinary in the rural areas

Irrigation

Karuna Dharai Eso

35mm. 1484ft. 17½mins.
Documentary film on Kangsabati project

Mahananda Bandh Prakalpa

35mm. 16mm. 1600ft.
18½mins.
Mahananda Bandh has done ample services to men of North Bengal. This Prakalpa has saved many people from the damage of flood

Hinglow (Project)

35mm. 461.77 mts.
18½mins.
Hinglow is a project of Birbhum District. The villages have got irrigation facilities of cultivation in the said district

Tista joy jatra

1000ft. 10mins.
The film is on irrigation

Sonar Fasal

606 mts. 21mins.
On irrigational project at Hinglow

Gramer Nam Harishchandrapur

606 mts. 20mins.
Harishchandrapur is a beautiful village in the district of Malda. The villagers have got irrigation facilities of cultivation

Cottage Industry

Ceramics (Coloured)

1505ft. 15mins.
Processing of ceramic products

Charma Silper Ittibritta

1015ft. 10½mins.
It is a film on tannery development of the Industry

Doll Maker of Krishnanagar

2000ft. 20mins.

Showing activities in the colony of the clay modellers at Krishnanagar

Hasta Silper Nabadiganta

1015ft. 10½mins.
Handicraft development

Paschim Banglar Gajadanta Shilpa

1015ft. 10½mins.
Ivory crafts of Murshidabad

Shone Shilpa

817ft. 9mins.
Cultivation and processing of Shone Fibres

Sisal-ba-konga

817ft. 8mins.
Cultivation and processing of sisal

Silpey Nari

1046ft. 11mins.
Women engaged in different cottage craft

Solar Katha

789ft. 8mins.
Product of shola

Development and C. D.

Durgapur Prakalpa

1100ft. 11mins.
Durgapur is developing day by day as because of planning

Ghatak Bidai

3990ft. 40mins.
Short feature on social conflicts in a village society (C. D.)

Coke Chullir Abadan

1015ft. 10½mins.
The iron industry of Durgapur is developing day by day for coke oven

Dandakaranya

1015ft. 10½mins.
Dandakaranya was a dense forest but now the condition of Dandakaranya has totally changed for the development

Bijan Bari (Hindi and Bengali)

985ft. 10mins.
The film is based on Tea Industry in North Bengal

Durgapur Coke Chulli

933ft. 9½mins.
The film depicts the progress of West Bengal for coke oven of Durgapur

Durgapur Parikalpana (1st & 2nd)

580 & 731ft. 14mins.
The film shows us this scheme and plants of Durgapur in the last 5 year plan has given a new shape of West Bengal for development

Natun Pathe Darjeeling

1808ft. 18½mins.

Development of Darjeeling is increasing day by day

Gram Amader

500mts. 20mins.
On village development

Natun Diganta

499mts. 20mins.
3 years activities of Left Front Government of West Bengal

Fisheries

Machher Sandhane (coloured)

600ft. 6mins.
West Bengal Govt. is trying to collect the fishes from different region of West Bengal for the benefit of the people

Development

Darjeeling Pragatir Pathe (Coloured)

521mts. 18mins.
Development of Darjeeling

Forest

Bannaya Pranir Bandhi Jiban

1015ft. 11 3½ mins. 35mm. 16mm.
The film shows the activities of wild animals

Jaldapara Prani Sangrakhan Kendra

1989ft. 20mins. 35mm.
Game sanctuary at Jaldapara

Education and Youth Activities

Kishorder janya bijnan

2929ft. 29½mins. 35mm. 16mm.
Science education for children produced during an exhibition on science for young groups

Mudran Shilpa

1015ft. 10½mins. 35mm. 16mm.
It is a film—school on printing technology

Saksharatar Abhijan

1015ft. 10½mins. 35mm.
It is a film on literacy of West Bengal

Acharjer Puraskar

614mts. 20mins. 35mm.
Short film on education

Niraksharatar Abhishap

500mts. 18mins. 35mm.
On problems of uneducated mass (to educate the illiterate mass)

Electricity

Bidyut Byabaharer Nirapattya

1015ft. 10½mins. 35mm.
Use of electricity and safety measures

Sakti-o-shilpa

1030ft. 11mins. 35mm.
Use of electricity in small industry

Health, Medical and Family Planning

Abhahelar Biphad

995ft. 10mins. 35mm.
The film shows the different rural health activities in West Bengal

Heart Operation

895ft. 9mins. 35mm.
It is a film showing the stages of operation of the heart

Jana Swastha

1015ft. 10½mins. 35mm.
It is a film on health and hygiene

Reen Parishad

2015ft. 20½mins. 35mm.
The film shows the different activities of Blood bank in West Bengal

Roge Theke Mukti

1035ft, 10½mins. 35mm. 16mm.
T.B. is a curable disease at present

Sonit Sanchar

1015ft, 10½mins. 35mm. 16mm.
It is a film about transfusion of blood in a Hospital

Swasthya aney Samriddhi

800ft, 8mins. 35mm. 16mm.
It is a film on general health and hygiene

Natun Alo (Leprosy) (Bengali and Nepali)

2000ft, 20mins. 35mm. 16mm.
The film shows the necessity for planning.

Dristidan

416.35mtrs. 15mins. 35mm. 16mm.
The film shows how blindness can be cured by a cornia operation

Tribal Welfare

Dhokra

2010ft, 20½mins. 35mm. 16mm.
Showing traditional crafts and the village of Dhokra tribe

Lodha Upajatir Bimukti-O-Bikash

1479ft, 15mins. 35mm.
On the life of the Lodha tribe

Pragatir Pathey Paschim Bangyer Adibasi

1015ft, 10½mins. 35mm. 16mm.
The film shows the Adibasi of West Bengal marching towards progress

Santal Samaj-O-Sanskriti

1015ft, 10½mins. 35mm.
The film shows the Santal communities, their development and their social manner and culture

Traffic and Civic Sense

Nagarik Sabhyata
1015ft, 10½mins. 35mm.
16mm.
This is a film on civic sense

Tourism and Places of Interest

Calcutta (Coloured)
2000ft, 20mins. 35mm.
On tourist interest in Calcutta

Sundarban (Coloured)
2000ft, 20mins. 35mm.
Showing beauty of the forests of Sundarban.

Problems of Darjeeling
499mtrs. 20mins. 35mm.
Problems of Darjeeling town

Terms of Hiring and other Facilities

Which films are available on loan basis : All as per list
Security deposit if any : Nil
Projector/Projectionist available : May be made available if not otherwise occupied
Cost of hiring at Calcutta : Nil (Outside Calcutta TA/DA of staff to be paid)
Any other relevant information : Films are to be accompanied by staff of Information and Cultural Affairs Section. Overtime allowances for staff to be paid by agency using the films. All films are Black and White and 35mm. except mentioned otherwise.

●

Name of Institution : The British Council Library
Address : British High Commission, Mittal Tower 'A' Wing Nariman Point, Bombay-400 021

List of Films

General

Interpreting the Weather Map

(909) Colour. 11 mins.
The construction and terminology used in the make-up of a synoptic chart. The cold and hot front. The work of weather stations and ships. The need for such activities for Air Traffic Control

The perception of Life

(1160) Colour. 20 mins.
The new worlds revealed to Renaissance investigators after the invention of the magnifying glass and, subsequently, the compound microscope are demonstrated. The influences of the developmental aspects of microscopic methods on man's conception of the

nature of life and the smallest possible living units

Chromatography

(675) Colour. 20 mins.
Show how different techniques of chromatography can be used to social and industrial problems. Demonstration of the use of column Chromatography in examination of food and drink ; it also illustrates the high performance of liquid chromatography and paper chromatography

Biology, Botany and Zoology

Behaviour of the Sea-Anemone

(27) 12 mins.
Time-lapse cinematography reveals slow activity of the body and tentacles connected with feeding, and shows that slow locomotion along the sea-bed is constantly taking place

The Ruthless One

(1289) 20 mins.
The life-cycle of the desert locust showing the problem involved in controlling it. The mapping of locust movement at the Anti-Locust Research Centre in London and other laboratories

Darwin and the insects of Brazil

(688) Colour. 30mins.
The publication of the joint paper by Darwin and Wallace on Natural Selection in 1856

Meiosis

(113) Colour. 12 mins.
Introduced by a chart showing the fertilization—meiosis cycle uses animated drawings to show how the number of chromosomes in germ cells are halved

Marsh Fritillary Butterfly

(1011) Colour. 15 mins.
The life history of this butterfly which lives on the scabious plant. (1959)

Mitosis

(114) Colour. 9 mins.
The basic principles of cell division and a consideration of the behaviour of chromosomes during division

The frog—A life history

(805) 15mins.
The process of fertilization and division of the egg. The phenomenon of grastrulation

Colourful Cuttle

(636) Colour. 14mins.
The feeding, behaviour, colour changes, locomotion and self defence of the cuttle fish

Elsa the Lioness

(736) 30mins.
This is the story of Elsa, the

lion and her relationship with Adamsons family

Looking at animals—Animals that Gnaw and Burrow

(102) Colour. 10mins.
An elementary account of rodents i.e. rats, mice, squirrels, procupines, voles, hamsters, etc.

Looking at animals—Deer and Antelopes

(103) Colour. 10mins.
Produced for young children to encourage them to look at animals with the eye of a naturalist

Looking at animals—Monkeys

(105) Colour. 10mins.
This deals with monkeys of both the old and new world types

Looking at animals—Sheep and Goats

(107) Colour. 11mins.
Sheep rearing here and in Australia. Goats behaviour rearing etc.

The Hedgerow

(863) Colour. 10mins.
Trees, flowers, wild insects and animals of a Devonshire hedgerow are shown by seasons

Looking at animals—Rabbits and Hares

(106) Colour. 11mins.
The special characteristics of British rabbits and hares with particular reference to their locomotion, variation of their coats

Looking at animals—Insect Eaters

(104) 16mins. Silent
The British members of the insectivores—small mammals like the hedgehog, mole and shrews—in typical situation and attitudes

The Birth Life and Death of cells

(37) 16mins. Silent
A film which features time-lapse photography to show various activities of animals cells in tissue culture. Nerve, blood and muscle cells are the main focus

Water in Biology

(1627) Colour. 22mins.
Water provides a stable environment for biological activity and is a basic essential in life cycles

The Living cell

(973) Colour. 21mins.
The Chemistry of the cell—Part I—The structure of Protein and nucleic acids

Structure of amino acids and methods of elucidating protein structure

Part 2—The Function of DNA and RNA in Protein synthesis

(974) Colour. 16mins.
Interference microscope pictures of cell division. Structure and function of RNA and DNA

Biology of Cockroaches

(575) Colour. 14mins.
Various organ systems, life history and classification of the cockroach

The life cycle of Maize

(98) 10mins.
The biological study of maize. Experimental and diagrammatic sections of the plant

Biology by enquiry

(574) 17mins.
Consists of two sequences. In the first instance students are introduced to biological classifications and in the second they investigate in class-room condition

Genetics and Plant Breeding

(824) Colour. 17mins.
Describes Mendel's experiments with peas in which plants of different characteristics were crossed and the ratios in which the various characters appeared observed

Molecules and Life
(1037) Colour. 20mins.
Outlines the achievements of Molecular Biology showing works of various Scientists

The double Helix

(1681) Colour. 12mins.
Shows the work of James Watson, Maurice Wilkins and Francis Crick in determining the structure of DNA

Root growth and soil fauna

(149) Colour T. V. 10mins.
At East malling research station biologists working in an underground laboratory with glass walls study of fruit tree roots

Climbing trees

(630) Colour. 12mins.
Examines the manner in which plants climb. Time lapse techniques are extensively used to illustrate the growth of roots and tubers

The DNA Story

(709) Colour. 45mins.
An historical account of the events and personal relationships surrounding the investigation of James Watson and Francis Crick

The germination and growth of plants

(842) Colour. 16mins.
The film is designed to cover the syllabus for 'o' level in biology illustrating origin and variety of fruits and structure of seeds

Plants movement

(1215) Colour. 6mins.

Opens with an explanation of the time-lapse technique in cinematography

Insects harmful to man

(930/4063) Colour. 16mins.
Shows how the activities of certain groups of insects are dangerous or detrimental to man's health, livestock and growing crops

Insects helpful to man

(931/4064) Colour. 18mins.
Shows ways in which man benefits from the activities of some insects e.g. honey bee, silkworms etc.

The human eye

(894) Colour. 15mins.
Man's binocular vision and field of view are contrasted with vision in other animals. Photography, models and animated diagrams are used

Capital garden

(4015) Colour. 43mins.
The story of Royal Botanical Garden, Edinburgh, from its inception in 1670 as physic garden until the present day

Amoeba

(4004) Colour. 17mins.
The principal techniques of illumination in microscopy are explained and morphology and behaviour of Amoeba are explained

The hot blooded Dinosaurs

(4054) Colour. 50mins.
Early experts came to regard Dinosaurs as slow moving sometimes aquatic cold blooded reptile-like creatures. This film oppose this idea

Insects : Adaptations for survival

(4061) Colour. 11mins.
Illustrates how various species of insects have evolved

Chemistry

Atoms and Molecules

(531) 15mins.
Elementary teachings about atoms and molecules

Solids, liquids and gases

(1684) 15mins.
Elementary teachings about solids, liquids and gases

The air we breathe

(512) 16mins.
The nature of earth's atmosphere, its composition and the use of oxygen by animals

Physics and chemistry of Water

(1165) Colour. 21mins.
Following a demonstration of how hydrogen and oxygen combine to water, the atomic structure of water molecule is shown in terms of its electronic character.

The British Council Film Library

The film library of the British Council Division, British High Commission, is housed in its office in Bombay.
The address is :

The British Council Library
British High Commission
Mittal Tower 'A' Wing
Nariman Point, Bombay-400 021.

The Library consists of only 16 mm documentary films—both informational and instructional—covering a wide range of scientific, technological, educational and cultural subjects.

Universities and their affiliated colleges, educational institutions recognised by the central or state governments, agencies directly under the central or state governments and industrial concerns in the public sector can become approved borrowers by applying to the Film Library through the British Council Division office in their region.

The films borrowed from the British Council Division are strictly for non-theatrical and non-commercial showing and must not be re-lent by the borrowing institutions. *Admission fees to screenings of these films must on no account be charged.*

These films are not censored and can be shown to invited non-paying audiences only.

The film library does not charge a membership fee but borrowing institutions are responsible for paying the postage charges of sending film parcels by registered parcel post, *both ways*. The Library will recover outward postal charges on films sent to them by regular billing.

Once an institution is enrolled as a regular borrowing member all requests and correspondence relating to films held in Bombay must be sent to Bombay.

Film catalogues are sent to institutions from Bombay after the formalities of enrolment are complete.

It is warned that the membership list is very full and new memberships are being accepted very sparingly, from University departments, few colleges and from public and private undertakings.

COMMUNITY HEALTH C
47/1, (First Floor, St. Marks
492

Name of the Institution : Films Division, Govt. of India
Address of the Institution : 15/1, Chowringhee Square, Calcutta-700001
Person to be contacted : Film Publicity Officer or PRO, Films Division, at the above mentioned address or at 24, Peddar Road, Bombay-400026

List of films

Wild Life of India

35/16 mm. 26 mins. Colour. Bengali
The film serves as a guide to the tourists to know about some of the easily accessible wild life sanctuaries of India. Typical flora and fauna in the game sanctuaries are shown

Conserve soil to conserve dam

16 mm. 16mins. Black and white. Bengali
It shows briefly how soil conservation is important and how on it depends the life of dams

Fight the floods

16 mm. 12 mins Black and white. Bengali
This film shows the devastation caused by floods in the country and highlights the work of the Central Flood Control Board

Efficient use of water

16 mm. 12 mins. Black and white. Bengali
A documentary on U.S. Contribution to the overall water development programme in India

Grand old water

16 mm. 12 mins. Black and white. Bengali
Stressing the need of water resources, the film shows how a river can be harnessed to peaceful purposes

Tree of wealth

16 mm. 8 mins. Colour. Bengali
Shows the utility of a tree and its service to the living world

Symphony of seasons

16 mm. 8 mins. Black and white. Bengali
Traces the cycle of seasons and its effects on the face of the land in various parts of India

Tomorrow may be too late

35/16 mm. 10 mins. Colour. Bengali
Many animals are in danger of extinction due to man's ruthless killing. An appeal for preservation of wildlife

Bachiye-Bachiye-Bachiye

16 mm. 8 mins. Black and white. Bengali

A film stressing the need for conservation of energy

Young Artisans

16 mm. 8 mins. Black and white. Bengali
Facilities available for training young artisans

Suhani Sadak

16 mm. 2 mins. Black and white. Bengali
On clean roads and streets ; how they are necessary

Food for Nutrition

16 mm. 12 mins. Black and white. Bengali
Shows the necessity of balance nutritious food intake

The Heartless Breed

16 mm. 9 mins. Black and white. Bengali
Shows the effects of food and drug adulterations

Skin in the bin

16 mm. 6 mins. Black and white. Bengali
A cartoon film show to keep your city clean and why

Warning signal
16 mm. 10 mins. Colour. Bengali
The film shows how water is being polluted and its effects on the living world

Two thalis
16 mm. 4 mins. Black and white. Bengali
The film appeals to people not to waste food, and shows the ultimate effect of the wastage

Geology in the service of Man

16 mm. 7 mins. Black and white. Bengali
Shows the role played by the Geological sciences in the development of the Country

Unknown Crook

16 mm. 3 mins. Black and white. Bengali
The film brings out the tragedies due to drug adulteration and suggests measures to fight this social evil

Save water

16 mm. 1 min. Black and white. Bengali
The film appeals to people not to waste water but save it

Good Earth

16 mm. 16 mins. Black and white. Bengali
The film shows how the land is transformed with bounty crops because of irrigation facilities and modern methods of cultivation

Petroleum Crisis

16 mm. 5 mins. Black and white. Bengali
Emphasises the need to cut petrol consumption in view of the world wide shortage and the increased price of oil

Terms of hiring and other facilities

All the films mentioned above are available on loan basis
Security deposit if any : Nil. Cost of hiring : Nil
Projector/Projectionist available : Yes
Cost of hiring at Calcutta : Nil. Outside Calcutta : Nil
Any other relevant information : All the films mentioned above, are available in the different regional languages of the country. Plenty of other films on this subject also are available for which the PRO of Films Division, may be contacted at the given address

Name of the Firm : Devjani Chaliha & Associates
Address : P-21, Golf Club Road, Calcutta-700033, Phone No. 46-0230
Activities : This Firm renders all possible help in Film making and Television programming. At a very reasonable cost they produce Documentary films, Advertising films, TV Commercials and TV News and Programmes, etc. A number of reputed films on Environmental Science and Life Science produced by this Firm (DCA Films) is listed below :

Delightful Nature

Colour. English. On the flora of north eastern India

Pride of Nature

Colour. English. On the fauna of north eastern India

Elephant befriended

Colour. English. On the training of newly captured elephants

Danger ahead

Colour. English, Khasi, Garo. On conservation of nature

The Dombugittim Story

Colour. English, Garo. On soil conservation

Biyer cheye boro

Colour. Bengali. Family Welfare Quickly

The Dirty hands around us

Colour. English. On prevention of adulteration

Ekhoni noy

Colour. Bengali. On family welfare quickly

Bisphoron

Black & white, English. TV Film on population explosion

Producer-in-charge may be contacted for further details.

VIDEO CASSETTES

On Environmental Science and Life Science

American Centre Library,
7, Jawaharlal Nehru Road,
Calcutta-700 013

VTR 551.6 E	Environmental series : Landsat, a satellite for all seasons : Pollution Solution—Northern Virginia Educational Television. 1976. 13 mins. Colour
	The Landsat satellite for all seasons ; Land for people, Land for Bears. 13 minutes, Colour
	The Landsat satellite for all seasons ; The Fractured Look. 13 mins. Colour
	Gate to World weather, 28 mins. Colour
301.31 VTR C	Century 3 Man in the Environment. Santa Monica, California Pyramid Films for USIA 1976-77. 27 mins. Colour

American Centre Library,
1, Bidhan Sarani,
Calcutta-700 073

VTR662 GAS B/C/M/ND	Gasohol : Growing some of our own fuel, U.S. Dept. of Agriculture, Motion Picture Div. 1980. 14 mins. Colour
VTR 557.6 M	The Global Weather Experiment. A Whole Earth View, U. S. National Oceanic and Atmospheric Administration. 1979. 14 mins. Colour

Video Cassettes on other topics also are available at the American Centre. These Video tapes may be seen through Video Cassettes Player installed at the American Centre Library

PART III

ENVIRONMENTAL EDUCATION

Regulations of M. Phil Course of Calcutta University

(As adopted by the Calcutta University Council on 7.1.83)

1.00 GENERAL

1.01 The M. Phil degree shall be a preliminary research degree which will include course work. The relevant programme shall provide facilities for undertaking research. Emphasis shall be laid on training in research methodology in a subject or in an interdisciplinary field.

1.02 Research work done for the M. Phil degree may be incorporated in the thesis for the Ph. D. Degree. However, the M. Phil degree is not a prerequisite for admission to the Ph. D. degree programme. A student may register himself direct for the Ph. D. Degree. Candidates shall not, however, be allowed to pursue both the courses simultaneously.

2.00 ADMISSION

2.01 Any candidate who has passed the M.A./M.Sc./M.Com. Examination of this University or of any other recognised University may be admitted to the appropriate M. Phil programme by the relevant Faculty Council on the recommendation of the M. Phil Committee concerned provided he has passed the M.A./M.Sc./M.Com. Examination in the subject/field or in an allied subject/field.

2.02 Every candidate seeking admission into the M. Phil programme shall apply to the Registrar together with a Registration fee (non-refundable) of Rs. 50/- on or before such date as may be notified. Candidates selected for admission shall pay a tuition fee of Rs. 200/-.

3.00 COURSE STRUCTURE

3.01 The candidates shall (a) take up four out of a number of Papers on advanced topics and on research methodology, and (b) submit a disseration or undertake a

project work. About 50% of the time shall be devoted to course work and seminars and the remaining 50% to dissertation/project work.

3.02 The course shall be so designed that these not only enhance the capacity to take up research but also aid to the students' deeper understanding of the subject/field.

3.03 A candidate shall attend and participate in at least four seminars for the purpose of discussing new results and developments in his chosen subject/field. At least one of such seminars shall be given by the candidates and shall pertain to his dissertation/project work.

3.04 The number of lectures/seminars per course shall be not less than 25 and the same for the whole programme shall be at least 100.

3.05 The duration of the course shall be one academic year. The dissertation may be taken up concurrently and completed within one year, or others with the courses but shall have to be completed within a maximum period of one more year, if necessary. No one shall be allowed to appear at the final Comprehensive Examination till he submits his dissertation/project work.

3.06 Conventional lecturing shall be replaced as far as possible by seminars ensuring the students' active participation. Presentation of papers and group discussion shall also be encouraged. Attendance at less than 75% and/or unsatisfactory performance at the seminars etc. shall disqualify a candidate from further studies. Decision of the M. Phil Committee concerned in this regard shall be final.

3.07 A candidate may be admitted into any of the following M. Phil Programmes :

Economics
Political Science
Philosophy
History
Applied Mathematics
Physical Sciences
Social Sciences
Environmental Science
Biophysics & Molecular Biology

Provided that the University may introduce new M. Phil programmes or modify, if necessary, the existing programmes subject to provisions of these Regulations. The University also reserved the right to offer or, not to offer, any or all of the M. Phil programmes in any academic year.

4.00 EXAMINATION AND EVALUATION

4.01 Performance of an M. Phil student shall be evaluated on a continuous basis as prescribed by the M. Phil Committee. The total marks allotted to a course, distribution of marks in each course to different components of performance, such as through terms papers, review essays, oral presentation in seminars, viva-voce, etc., shall be spelt out at the beginning of the session by the concerned M. Phil Committee.

4.02 The Scheme of examinations shall be as follows :

(i)	Course work (four papers of two hours each, each carrying 50 marks)	... 200 marks
(ii)	Internal Assessment (based on seminars, review essays, etc.)	... 100 marks
(iii)	Dissertation/Project Work	... 100 marks
(iv)	Final comprehensive/Viva-voce Examination	... 100 marks
	TOTAL	... 500 marks

In order to pass, a candidate must obtain 250 marks. Each successful candidate shall be awarded the degree in the form as set out in the Appendix.

Only those candidates who have prosecuted the course of studies for one academic year and submitted the dissertation/project work assigned to him in terms of these regulation, shall be eligible for admission to the final comprehensive/Viva-voce examination. Eligible candidates shall apply in the prescribed form for admission to this examination together with an examination fee of Rs. 200/-.

4.03 A Board of Examiners shall be appointed by the relevant Faculty Council on the recommendation of the M. Phil Committee to assess performance of the candidates at the examination as also to examine the dissertation/Project work. The Board of examiners at a meeting shall make assignments to the examiners.

5.00 ADMINISTRATION OF THE M. PHIL PROGRAMMES

5.01 The M. Phil programme shall be conducted by a University Department or a group of such departments. However, recognised Research Institutes within the jurisdiction of the Calcutta University may collaborate and participate in these programmes with the approval of the relevant Faculty Council.

5.02 The M. Phil programme shall be administered by the M. Phil Committee consisting of the Head(s) of the concerned Department(s), five whole-time teachers of the University and not more than three external experts participating in the M. Phil programme to be nominated by the Vice-Chancellor in consultation with the Dept. Committee, if any. The Vice-Chancellor shall also appoint one of the members as the Programme Co-ordinator who shall act as the Convener of the M. Phil Committee.

5.03 The M. Phil Committee shall—

(a) recommend to the relevant Faculty Council candidates for admission to the M. Phil Course, and assign them to individual supervisors for guidance of their dissertation or project work ;

(b) draw up the syllabii and prescribe methods of evalution for the courses, define the limits of the subject and course contents, and modify them, as and when necessary, with the approval of the relevant Faculty Council ;

(c) make assignments to the teachers and the guides ;

(d) organise seminars/tutorials etc. ;

(e) make all arrangements for evaluating the performance of the M. Phil students ;

(f) recommend names to the Faculty Council for appointment to the Board of Examiners ;

(g) recommend to the Faculty Council the award or otherwise of the M. Phil degree to the students, after considering the records of their performances, to be kept in the manner prescribed by the Syndicate ; and

(h) perform such other duties in connection with the administration of the M. Phil programme as may be directed by the Faculty Council.

5.04 Teachers and guides for the M. Phil programme shall be invited by the Vice-Chancellor in consultation with the Programme Co-ordinator and the Departmental Committee, if any, from amongst experienced teachers of the University and senior academic staff of recognised research institutes who possess distinguished record of productive research work, to participate in the Programme.

5.05 Ordinarily not more than two M. Phil students shall be assigned to any individual for dissertation/project work and no individual shall ordinarily teach more than two courses in an M. Phil programme.

5.06 Those Regulations shall come into effect from the academic session 1983-84 and replace all the existing regulations for the M. Phil course of the University therewith.

APPENDIX

Master of Philosophy

This is to certify that..... ..... obtained the degree of Master of Philosophy in this University in the year..... ....., the subject/field in which he was examined having been ....

SENATE HOUSE,

The.....19.....

Vice-Chancellor

UNIVERSITY OF CALCUTTA

Programme in Environmental Science for Research, Training and Degree in Environmental Science (M.Phil)

1. PREAMBLE :

During the last few decades there has been a significant trend of increasing awareness of the problems of scarcity of resources, ecological disturbances and environmental pollution due to explosive population growth, rapid industrialization and uncontrolled use of natural resources which have been going on over the century. These global problems facing the mankind found significant expression in the U. N. Conference on Human Environment in Stockholm in 1972, where an Action Plan was formulated with a series of recommendations for efficient environmental management and sound environmental education and training (U. N. Conference on Human Environment, Recommendations & Actions Plan, Stockholm, 1972). The resulting United Nations Environmental Programme operating since 1974 in Nairobi has focussed on the educational and training aspects of man and environment issues and has recommended various action for "strengthening of environmental education and in particular of post-graduate environmental training" towards efficacious environmental management. (U.N.E.P., The State of Environment Report, 1975-1981. Report on Training Activity, Nairobi, Paris, 1980). The subsequent Workshop on Environmental Education in Solgrade in 1975 and the inter-governmental World conference in Environmental Education held in Tbilist, USSR also put forward specific recommendations of, inter alia, conducting environmental education programme ranging from elementary to post-graduate stage of education and in formal as well as in non-formal sectors. (UNESCO UNEP, Intergovernmental Conference on Environmental Education, Tbilist 1977). Moreover UNESCO, through its various programmes on Ecological Sciences, Hydrological Sciences, Engineering Education, Human Settlements and its Man and Bio-sphere programme has strongly emphasised the need for inter-disciplinary approach in dealing with all kinds of problems of Man and Environment and has advocated "explicit incorporation of environmental dimension in the teaching of Physical Science, Biological Science, Earth Science and even Social Science" (UNESCO, Man & His Environment, 1979). In association with UNEP, it has

sponsored and conducted training programme for engineers and technologists incorporating environmental aspects in Engineering and Physical Sciences education.

At the national level in India, the National Committee on Environmental Planning and Coordination and the Department of Environment/Science and Technology have lately laid such emphasis on inter-disciplinary research, education and training in the area of environmental problems and management. The University Grants Commission has been also advocating inter-disciplinary and integrated approach by pooling together resources, methodologies and expertise in different University departments for tackling manifold problems of Environment and Society. Lately the Planning Commission has been sponsoring research projects on environmental problems of Ganga River taking it as a resource base and a life-supporting system through inter-disciplinary and multi-dimensional approach by inter-institutional efforts in order to solve various ecological problems in Ganga River in an integrated way. The University of Calcutta is very much involved in it through the participation of its Departments of Agriculture, Botany, Geography, Zoology etc.

The Planning Commission has also incorporated the environmental impacts and ecological management in the case of all kinds of field based development projects in its VI Plan documents, and has urged all State Governments and Central Govt. Ministries to adopt ecologically viable development projects in different fields (Govt. of India, VI Plan document, New Delhi).

2. PROGRAMME IN ENVIRONMENTAL SCIENCE

It is in this context that the University of Calcutta is initiating an inter-disciplinary Programme in Environmental Science involving the various disciplines in Earth Sciences, Biological Sciences, Physical Sciences etc.

The Programme will have three fold components, such as follows :

(a) Guiding and coordinating inter-disciplinary researches of environmental concern sponsored by UGC, Planning Commission and other agencies.

(b) Conducting Seminars, Conferences and Workshops in the area of environmental problems, planning and

management for training of students, scholars, young teaching staff etc.

(c) Running a M. Phil. degree course in Environmental Science by involving students and teachers in Earth Sciences (Geology, Geography etc.), Biological Sciences (Botany, Agriculture, Physiology, Zoology, Anthropology etc.), Physical Sciences (Physics, Chemistry, Biochemistry, Applied Mathematics etc.).

3. M. PHIL. DEGREE IN ENVIRONMENTAL SCIENCE

A. Objectives

(a) To *orient* students of Earth, Biological and Physical Sciences in the proper understanding of the functioning of the Environmental system—physical as well as human and of the major Man and Environment relationship and issues.

(b) To *acquaint* the students of Earth, Biological and Physical Sciences with the courses and effects of ecological disruption environmental degradation and pollution, deterioration in public health status, etc. due to industrial-urban growth, technological development and mismanagement of environmental resources.

(c) To *train* students and scholars in the fundamental principles of environmental science in an integrated manner so as to be applicable towards sound environmental management and control, balanced development without minimum injury to its environment, and techno-ecological solution to environmental damages. This course shall integrate various environmental problems and issues in the area of Earth Science (Geology, Geography etc.), Biological Science (Botany, Agriculture, Zoology, Physiology, Anthropology etc.) and Physical Science (Physics, Chemistry, Biochemistry, Applied Mathematics etc.) and equip the students to conduct teaching, research and professional activities of interdisciplinary nature in the area of environmental science.

B. Purpose

(a) The M. Phil degree should be looked upon as a preliminary research degree which will include course

work. It would provide a background for undertaking research and emphasis will be laid on training in research methodology.

(b) The M. Phil. degree will also provide an opportunity to candidates to proceed to Ph.D., it being understood that the research work done for M. Phil. degree could be incorporated in the thesis for Ph.D. degree.

UNIVERSITY OF CALCUTTA

M. Phil. course in Environmental Science

Constituent Departments

1.	Botany	(Biological Science)
2.	Zoology	,,
3.	Physiology	,,
4.	Agriculture	,,
5.	Anthropology	,,
6.	Life Science	,,
7.	Geography	(Earth Science)
8.	Geology	,,
9.	Physics	(Physical Science)
10.	Chemistry	,,
11.	Biochemistry	,,
12.	Applied Mathematics	,,

Courses for Study and Distribution of Marks

(1) Course Work (Four papers each carrying 50 Marks) 200 Marks

A. Core Topics (Compulsory for all the students coming from different disciplines)

Course No. 1 50 Marks
Course No. 2 50 Marks

B. Special Topics relevant to each discipline participating in the Programme

Course No. 3 100 Marks

(2) Internal Assessment—based on Seminars, Reviews Essays, etc. 100 Marks
(3) Dissertation/Project Work 100 Marks
(4) Final comprehensive Viva-Voce Examination 100 Marks

Total 500 Marks

The List of Calcutta University teachers participating in teaching of M. Phil. course in Environmental Science.

Department of Zoology

1. Prof. Amalesh Chowdhury
2. Dr. N. C. Dutta
3. Dr. Ajit Kumar Sarkar
4. Dr. S. G. Pal
5. Dr. N. B. Chatterjee

Department of Physiology

1. Dr. B. N. Koley
2. Prof. C. Deb
3. Prof. R. N. Sen
4. Dr. S. P. Chatterjee
5. Mrs. Sakuntala Dasgupta
6. Dr. (Mrs.) Pratima Chatterjee

Department of Biochemistry

1. Prof. J. J. Ghosh
2. Prof. I. B. Chatterjee
3. Dr. A. B. Banerjee
4. Dr. (Mrs.) Manju Mukherjee
5. Dr. Sudip Banerjee
6. Prof. G. C. Chatterjee

Department of Geography

1. Prof. K. G. Bagchi
2. Prof. B. Banerjee

Department of Physics

1. Prof. R. K. Poddar
2. Dr. A. Thakur
3. Dr. B. Bagchi
4. Dr. Utpal Chowdhuri
5. Dr. Asit Baran Sanyal

Department of Botany

1. Prof. S. Mukherjee
2. Dr. R. Purakayasta
3. Dr. R. K. Choudhuri
4. Dr. Prabir Chatterjee
5. Dr. N. Paria

Faculty of Agriculture

1. Prof. T. M. Das
2. Prof. S. P. Banerjee
3. Prof. R. N. Basu
4. Dr. S. K. Pal
5. Dr. M. K. Majumdar

Department of Chemistry

1. Prof. D. Banerjee
2. Prof. M. Sengupta
3. Prof. P. Bandyopadhya
4. Dr. A. K. Sen
5. Dr. N. Saha
6. Dr. S. Roy
7. Dr. G. N. Mukherjee

Department of Anthropology

1. Prof. D. P. Mukherjee
2. Dr. Asok Ghose
3. Dr. A. R. Banerjee
4. Dr. Tulika Sen
5. Dr. S. K. Sengupta
6. Dr. M. Bhattacharya
7. Dr. Ranjana Ray

Prof. T. M. Das
Co-ordinator

M. Phil SYLLABUS ON ENVIRONMENTAL SCIENCE

CORE TOPICS

(Compulsory for all the students coming from different disciplines)

CQURSE NO. 1

ECOLOGY, POPULATION AND ENVIRONMENT : ISSUES AND PROBLEMS

(50 Marks)

TOPIC NO.

1.1 Ecological factors and environmental interactions—Air, Water, Soil, Temperature, Light, Oxygen and Plants and Animals.

1.2 Principal components of Ecosystem, Ecosystem dynamics, Productivity.

1.3 Bio-geochemical cycles.

1.4 Eco-energetics—Foodchain, Food web, Ecological pyramids, Energy flow.

1.5 Principles of Ecological web, Balance in Ecosystems.

1.6 Principles of Strategy of Survival in Nature.

1.7 Demography and Ecosystem.

1.8 Supporting capacity of plant, soil and water.

1.9 Biochemistry of food and nutrition.

1.10 Control of population growth—Urban and rural systems and quality of urban and rural life, Socio-economic factors and constrains.

PART III

COURSE NO. 2

RESOURCE CONSERVATION, POLLUTION AND ENVIRONMENTAL MANAGEMENT

(50 marks)

TOPIC NO.

2.1 Global and regional distribution of natural resources—Agricultural, Forest, Mineral and Fossil-fuel.

2.2 Renewable and non-renewable resources vis-a-vis Technological innovation.

2.3 Trend of exploitation of natural resources, Conservation of soil, water and forest, Resources Management and Conservation strategy.

2.4 Global trend of pollution of environment—air, water, soil, sound, heat and radio-active pollutants. Regional pollution from petrochemicals, iron and steel, paper and textile and cement industries.

2.5 Plant responses to air pollution.

2.6 Problems of urban sewage and rural sanitation.

2.7 Impact of agricultural pollution on ecosystem.

2.8 Techniques of controlling environmental pollution including Biological controls.

2.9 Parameters of pollution and Environmental Laws.

2.10 Problems of Environmental Management.

M. Phil. COURSE IN ENVIRONMENTAL SCIENCE

COURSE NO. 3

Special Topic : Botany

(100 Marks)

Environmental complex

Modes of action of environmental factors, multiplicity of factors, heterogeneity of environment, dynamic nature of environment, variability of plant requirements, factor interaction, optimal and limiting factors ; extrapolation from controlled environment to the field-phytometer method.

Plant and its environment

Germination, vegetative growth, flowering and fruiting of plants and their relation to environmental conditions.

Ecosystem Dynamics

Energy flow, mineral cycling, cycling of gases, interactions between organisms, vegetational change and stability, balance in the ecosystem.

Terrestrial ecosystem types

Tropical rainforest, Tropical savanna, Warm deserts, Cold deserts, Montane coniferous forests, Boreal coniferous forest, Alpine tundras, Arctic tundra.

The Impact of Man on Environment

Impact of pre-agricultural man, agricultural man, industrial man on environment, applied ecology of the individual, populations and ecosystems, natural, modified and synthetic ecosystems, pollution and conservation of nature.

Reference Books

1. Billings, W. D., 1964. *Plants and the Ecosystem*, Macmillan & Co., London.

2. Daubenmire, R. F., 1974. *Plants and Environment*. 3rd ed. John Wiley & Sons, New York.

3. Kellman, Martin C., 1980. *Plant Geography*. 2nd edn. Methuen & Co., London.

4. Wratten, Stephen D. and Gary L. A. Fry, 1980. *Field and Laboratory Exercises in Ecology*. Edward Arnold, London.

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COURSE NO. 3

Special Topic : Zoology

ENVIRONMENT AND ANIMAL WORLD

(100 Marks)

Distribution of animals in space and time (General Idea)

Distribution of animals in forests, mountains, plains, deserts, marine and estuarine biomes in India.

Hooghly-Matlah estuarine complex ; Mangrove ecosystem ; horizontal and vertical distribution of littoral fauna in Hooghly-Matlah estuarine complex ; population fluctuation as related to seasonal and diurnal environmental variations ; Biological clocks in marine and estuarine benthic fauna.

Structure and function of biotic community ; Species diversity in communities ; Principles pertaining to limiting factors ; Behaviour as phenomenon of animal populations, Animal societies and territoriality ; Demography and health ; Zoonotic potentialities of malaria, filaria and leishmaniosis ; Control of diseases borne by animals (slugs, snails and insects etc.).

Reference Books

1. J. M. Edington & M. Ann Edington, Ecology and Environmental Planning, 1977.

2. Allen H. Penton and William E. Werner, Jr. Field Biology and Ecology. T.M.H. Edition, 1976.

3. Kendaig, Animal Ecology, 1974. E. E. E. series (Indian edition), Prentice Hall Publication.

4. R. G. Bond and C. P. Straub (Ed.). Hand Book of Environmental Control. 4 Vols. (1973-1974), CRC Press, Cleveland, Ohio.

COURSE NO. 3

Special Topic : Physiology

ENVIRONMENTAL PHYSIOLOGY AND HYGIENE

(100 Marks)

Application of Science, Technology and Art to Control, Conservation and Improvement of environmental quality.

Physical, chemical, physiological and psychophysiological and social aspects of the environment ; corporal and mental responses to changes in environment, Physical nature and biological behaviour of air, water, soil, food and waste affecting man's occupational agricultural, industrial, official, domestic, recreational, social and cultural activities.

(A) PHYSICAL ASPECTS OF ENVIRONMENT

(i) *Thermal Environment*

Effects of hot and cold conditions (Physical factors : air temperature, humidity, solar and other thermal radiations, air movement—methods of measurements) ; Ventilation of buildings ; fresh air requirements ; use of deodourants in public places. Effects of different types of pleasant and disagreeable odoriferous substances.

(ii) *Visual, Acoustic and Olfactory environment*

Methods of measurement ; Illumination levels ; Lighting standards ; Role of different colours ;

Glare and discomfort ; Flicker Phenomena—critical fusion frequency ; eye movements (Voluntary activities and spontaneous blinking) oculography ; methods of measurements of lavels of noise and vibration ; principle of hearing loss and

auditory damage with industrial and other noises, effects of music. Measurement of threshold of smell—olfactometer ; Effects of ionizing radiations.

(B) PHYSIOLOGICAL AND PSYCHOPHYSIOLOGICAL ASPECTS OF ENVIRONMENTS

Human sensitivity to heat, light, sound, vibration, smell perceptual, effects of heat (dry and wet)and cold exposures —steel mills, cold storage etc. ; heat and cold stress indices ; Effects of noise and vibration—their interactions ; limits of tolerance ; environmental factors limiting work output ; heat disorders—methods of protection, thermal barrier—protective clothing and suits ; acclimatization ; principles of construction and use of climatic (psychrometric) and sound-proof and illumination chambers. Methods of assessment of heat balance—(thermal exchanges between men at work and environment) ; body temperature regulation during work ; water balance ; rectal, oral, aural and skin temperatures ; heat storage.

(C) CHEMICAL ASPECTS OF ENVIRONMENT

Effects of industrial hazards e.g., dusts, smokes, fumes (Pneumoconeosis, bysinosis, asbestosis etc.) ; harmful effects of bad environment ; soil, air and water and food pollution, reduction of environmental load ; Methodological approaches to deriving environmental health standards, allowable limits (MAC=maximum allowable concentrations) TLV (Threshold Limit Values) and modified TLVs of occupational exposure to potentially toxic substances conveyed by air ; Air borne contaminants ; methods of measurements and concepts ; toxicity of the penetration of substances at oral, inhalatory and cutaneous routes, Dose-response curves ; Quantification of doses depending on different factors such as body weight, surface area, body composition, circadian rhythm, adaptation ; cumulation potentials, synergism ; the problem of threshold concentrations, in workers entrusted with the fulfilment of important tasks ; Effects of ionizing and non-ionizing radiations ; short-term and long-term effects ; short lasting allergies ; long lasting-carcionogenics and teratogenics, mutagenicity.

Biological monitering ; Estimations of effects on blood, cardiovascular, respiratory, gastro-intestinal (liver), urogenital, nervous and other systems, Environmental problems and cost-benefit analysis.

(D) ALTITUDE AND SPACE

Effects of high and low barometric pressures on work capacity ; physiological adaptation of altitude dwellers and highlanders in comparison to sea-level dwellers ; Physiology of mountaineering. Effects of different types of acceleration and decelaration of man in motion (in air craft) ; human tolerance and performance. Effects of positive, negative and zero G-forces. Human centrifuge ; weightlessness and performance. Ergonomics of space flights. Disorientation ; gravitation cues ; visual illusion ; oculogyral illusion ; fascination ; isolation.

(E) ACQUATIC ENVIRONMENT

Physiology of diving in man and other animals—surface and underwater swimming and deep-sea diving ; physiological problems in pressurization and decompression, protection from decompression ; underwater construction work in sealed caissons ; Safety aspects ; problems of speech intengibility and communication with the use of helium in submarine ; effects of long-term living in submarines ; phenomena of sensory deprivation ; design of naval equipment clothing etc. for use of seamen ; simulation experiments ; capabilities and nutrition of seamen and divers ; Use of marine resources.

(F) SOCIAL ENVIRONMENT

Living with animals including man ; Interactions between man and animals ; man and man ; Zoonetic diseases such as brucellosis, anthrax, leptospirosis, tetanus, bovine tuberculosis, ancylostomiasis etc., problems of overpopulation, congestion and unhygienic conditions.

PART III

COURSE NO. 3

Special Topic : Agriculture

ENVIRONMENTAL PHYSIOLOGY OF CROP PLANTS

(100 Marks)

Physiological Ecology

1. Light
2. Radiation
3. Temperature
4. Moisture
5. Pollution
6. Physiology of Environmental Stresses

Environment and Food Production

1. Recent history of agricultural production
2. Food production in relation to solar and subsidised energy
3. Nature and area of land under cultivation
4. Land fertility and crop yield
5. Food from the sea and other new sources
6. Impact of forest on food production
7. Reduction of food losses through management of environment

Crop Environment and Heredity

1. Mutation, Polyploidy and Evolution
2. Crop performance and yield—environmental constraints breeding for improvement
3. Adaptability, resistance and productivity—genetic improvement ; direction and techniques

Reference Books

1. A. C. Leopold, 1964, Plant Growth and Development, Tata McGraw Hill, Bombay, Calcutta

2. H. Mussell and R. C. Staples, 1979, Stress Physiology in Crop Plants, Wiley Inter. Science, New York

3. Paul, R. Ehrlich and Anne H. Ehrlich—Population, Resources, Environment, Freeman, Sanfrancisco.

4. R. W. Allard—Principles of Plant Breeding

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COURSE NO. 3

Special Topic : Geography

(100 Marks)

Concept of Geographical Environment

Physical Environment ; Human Environment ; Biotic Environment ;

Cultural Environment—Rural and Urban.

Major Geographical Zones of the Earth : Environmental Factors shaping major Geographical Zones ;

Physico-Chemical processes associated with major Geographical zones.

Anthropogenic Landscape : Man induced Geomorphic Processes :

Man and Ecosystem ; Physical components ; Energy Flow and Energy Balance in Bioshpere ; Soil-Water Balance ; Material cycle in Eco-systems ; Man's impact on Terrestrial and Marine Eco-system.

Man and Earth Resources :

Major kinds of earth resources ; Forest, Soil, Agricultural land, Minerals, Fuels, Water bodies ; Population growth and food demand ; Problems and Prospects of Mineral and Fuel Resources ; Impact of Urbanization and Industrialization ; Water use and environmental problems ; Natural environment and Recreational needs ; Urban development ; Industrial growth and Quality of air and water.

Cultural components in Man and Environment relationship :

Man, Technology, and Environment, Exploration, utilization and conservation of renewable and non-renewable resources ; Problems of material balance ; Environmental Management ; Environmental Hazard and Perception ; Geomorphological investigation, ecological mapping and Environmental planning ; Case studies.

Reference Books

1. M. I. Budyko, Global Ecology, Progress Publishers, Moscow, 1980

2. A. N. Strahler, Environmental Geoscience, John Wiley, New York, 1973

3. A. H. Strahler & A. N. Strahler, Geography and Man Environment, John Wiley, New York, 1977

4. P. R. Ehrlich, A. H. Ehrlich & J. P. Holdren, Human Ecology, Freeman, San Francisco, 1973

COURSE NO. 3

Special Topic : Environmental Geology

(100 Marks)

Land Use and Resources

Definition and status of geological components of ecosystem ; solid earth and hydrologic cycle ; land and water resources ; geological phenomena and processes, and their response to environmental changes and impact.

Land use and resources ; psysiographic approach to land use planning for agricultural development ; geological factors and controls for urban and industrial development ; concentration of habitat around earth's resource bases, availability and proximity of ancilliary resources.

Responses and hazards due to environmental modifications ; influence of biota on land mass ; effects of cultural practices on land forms ; types of erosion and degradation due to urbanisation ; extraction of solid non-renewable earth resources and mining spoils ; pollution of other environmental components ; conservation of resources.

Water regime

Classification of various components of water regime as related to hydrologic cycle : (a) surface water including, oceans, seas, rivers, springs, lakes, estuaries, snowlines, glaciers and ice caps, (b) groundwater.

Water resources and uses for various environmental and cultural needs ; renewable components and limits of use of surface and ground water resources involving quality and quantity ; modes of harnessing, routing, recycling and conservation of surface water and ground water reserves ; special techniques and problems of artificial ground water recharge and augmentation of snow-melt for deficient regions ; nuclear hydrological techniques ; conjunctive use of surface water and ground water.

Demand-response model of hydrologic and hydrogeologic systems and impact of environment ; hazards due to water use and hydrologic imbalances in catchment areas ; fluvial channels and ground water storage ; soil erosion, floods, deterioration of estuaries ; irreversible disturbance of water balance of basins ; subsidence due to overdrawal of ground water.

Special Environmental Problems

Problems of areas with uncontrolled elements ; seismic zones and remedial practices ; arid zones and ameliorative practices ; coastal areas including littoral-tidal zones with beach-erosion and sea-water intrusion into coastal aquifers ; protective or corrective and balanced practices ; problems of drought-prone areas and concept of inter-basin transfer of water resources ; disposal of nuclear wastes.

Examples and case histories from different parts of the world and India. Need for conservation and optimum use of natural earth resources ; need for laws and regulations for conserving and protecting various components of geologic environment.

Reference Books

1. P. T. Flawn—Environmental Geology
2. Frederick Betz ed.—Environmental Geology
3. Ven Te Chow—Handbook of Applied Hydrology

Journals

1. Spinger verlag—Environmental Geology
2. Elsevier Publishing House—Environmental Preservation

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COURSE NO. 3

Special Topic : Physics

(100 Marks)

Physics of Air Pollution

Properties of the earth's atmosphere : composition, temperature profile, different layers ; the troposphere, stratosphere, mesosphere and ionosphere.

Particle size and its measurement ; different size distribution of tropospheric aerosols ; sedimentation methods in atmosphere and terminal velocity ; light absorption scattering by particles suspended in the atmosphere, adsorption and catalysis of gases by tropospheric aerosols.

Nature of pollutants : Oxides of sulphur & nitrogen hydrocarbons and particulate matter. Photochemical smog. Release of radioactive material to the atmosphere. Elements of photochemical reaction.

Effect of atmospheric smoke and contaminants on human and plant health ; surfaces of buildings and statues, metallic structure, clothes and books.

Physics of Water Pollution

Physical properties of pollutants in water pollution ; Heavy Metals in water pollution ; Techniques and instrumentation for identifying and studying the water pollutants.

Radioactive Waste Disposal

Fission process and elementary theory of nuclear reactors ; Instrumentation for nuclear measurements ; processing and storage of radioactive wastes like fission products in sealed containers, air-cooled vaults and placement in geological formations.

Effect of radiation on human body ; Genetic changes ; shielding and monitoring of radiation.

Reference Book

1. A. C. Stern (Ed.), Air Pollution, A. P., New York, 1968.

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COURSE NO. 3

Special Topic : Chemistry

CHEMISTRY, MAN AND SOCIETY

(100 Marks)

1. BIO-INORGANIC CHEMISTRY

The elements of life. Trace element components of an ideal diet. The roles of inorganic species *in vivo*—abundant elements, trace and ultra-trace elements. Enzymes and Co-enzymes, Cofactors, Metalloproteins and Metallo-enzymes, and metal ion activated enzymes. Biological function of Fe, Cu, Zn, Co, Mn, Ni, Cr, V, Mo, Si, Sn, Se, F, Cl. Br, I. Principles of complex formation and its significance in biological systems. Metal poisoning Metal detoxification. Metals in drugs and in chemotherapy. *(Instructor : Dr. N. Saha)*.

2. ENVIRONMENTAL POLLUTION AND CHEMISTRY

(i) *Toxic substances in Man's environment*

Corrosive, metabolic, neurotoxic, mutagenic and carcinogenic poisons. Detoxification in nature and in human body.

(ii) *Air pollution*

Chemistry of air. Composition of the atmosphere (the troposphere). O_2-CO_2 natural cycle. Particulate and gaseous pollutants in the air and their sources. Smog, preventive measures to combat air pollution.

(iii) *Water-pollution*

Chemistry of water and its uses. The natural water cycle. Organic and inorganic pollutants in water. Dissolved and suspended matter. Biochemical oxygen demand (BOD). Pollution by sewage, industrial effluents, discharges from metal processing and atomic power plants. Effects of fertilizers, detergents, pesticides, heavy metals, Fluoride, nitrate, etc. Hardness of water. Preventive measures for water pollution. Sewage treatment, water purification processes for domestic and industrial uses. Fresh water from the sea. *(Instructor :* (i)-(iii) *Prof. D. Banerjee, Dr. D. N. Mukherjee)*

(iv) *Corrosion Chemistry*

Physico-chemical basis of redox processes. Electrochemical theory of corrosion. Corrosion preventive measures—Cathodic protection, protective coatings including metal plating (thermal and electrochemical), and alloying. *(Instructor : Prof. M. Sengupta).*

3. CONSUMER CHEMISTRY

(i) *Food Chemistry*

Food ingredients and their sources. Chemistry of cooking. Food additives for colour, taste and flavour. Food preservatives. Diet Pills. *(Instructor : Dr. S. Ray).*

(ii) *Medicines*

Pain killers, Antacids, antiseptics and disinfectants. Antibiotics. Allergens and antihistamines. Birth control pills. Drugs in combination. Use and misuse of drugs. *(Instructor : Dr. A. K. Sen)*

(iii) *Cleaning Agents*

Soaps, synthetic detergents and cleaning agents. Bleaching agents and optical brightners. Organic solvent cleansers. Stain removers.

(iv) *Beauty Aids*

Cosmetics. Depilatories. Hair colouring and bleaching. Hair sprays. Deodorants. Perfumes. Face powder. Lipstick. Nail polish. Eye makeup. Creams. Lotions.

(v) *Fuels, Lubricants and Greases*

Solid, liquid and gaseous fuels. Gasoline and additives, antiknock agents. Lubricants and greases. Antifreeze. *(Instructor : Dr. S. Ray)*

(vi) *Paints and Varnish*

Basic components of paints. Oil-based paints. Water-based paints. *(Instructor : Dr. S. Ray)*

(vii) *Chemistry of Photography*

Black and white photography. Photochemistry of silver salts. Spectral sensitivity. Chemistry of development and fixing. Toning. Colour photography. Polaroid film.

(viii) *Alternative sources of energy*

Nuclear energy. Trapping and utilization of solar energy. Photochemical splitting of water for generation of hydrogen as a fuel. Advantages of hydrogen as a fuel. *(Instructor :* (vii) & (viii) *Prof. D. Banerjea)*

4. PRINCIPLES OF TRACE ANALYSIS

Applications of physico-chemical principles and techniques for the identification, estimation of trace elements and trace constituents in man's environment, in food and in living systems. Principles of chromatography (including GLC), ion-exchanges, solvent extraction, flame photometry, colorimetry atomic absorption spectroscopy, polarography and other electrochemical techniques, and radiochemical methods. *(Instructor : Dr. P. Bandyopadhyay)*

COURSE NO. 3

Special Topic : Biochemistry

(100 Marks)

(a) *Aspects of Atmospheric Chemistry*

Urban Air quality ; stratosphere composition ; migration and fate of atmospheric trace substances ; chemical aspects of climatic change.

(b) *Major Pollutants of Air*

Types, sources, formation, control and removal.

(a) *Major Pollutants of Water*

Types, sources, contamination, control and removal.

(b) *Organic Waste Management and Bioconversion*

Application of Biochemistry and Microbiology.

(c) *Pesticides & Insecticides, Herbicides*

Types, Mode of action, Biodegradation, Bioaccumulation and Toxicokinetics.

General Pollutants and their bio-toxic effects

(a) Partition co-efficient and water solubility in Environmental Chemistry.

(b) Bio-accumulation, metabolism activation and inactivation of chemical pollutants within living system.

(c) Microsomal drug detoxification.

(d) Polycyclic hydrocarbons and carcinogenesis.

(e) Mutagenesis.

(f) Reproductive toxicology.

(g) Behavioral toxicology.

Reference Books

1. The Biochemistry of Pollution (Studies in Biology series 123) JH Ottaway (pp 60) Edward Arnold London (1980)

2. Environmental Chemistry Air & Water Pollution by H. Stephen Stoker & Spencer L. Seager. Scott Foresman & Co. Gleenview, London

3. Introduction to Environmental Toxicology F.E. Guthrie & J.I. Perry Blackwell 484 p, (1975).

4. Detoxification Mechanism R.T. Williams. Arnold

5. Pathways of Pollutants in the atmosphere. Royal Society London (1979).

6. Air pollutants Chemistry Butter J.D. Acad. Press (1979)

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COURSE NO. 3

Special Topic : Applied Mathematics

ENVIRONMENTAL FLUID DYNAMICS

(100 Marks)

Basic thermodynamics of the Atmosphere and Oceans,

Basic equations of geophysical fluid dynamics ; Wave motions ; Shallow water theory ; Rossby waves ; B-plane. Energy and Entrophy.

Dynamics of Ocean ;

Theory of ocean currents ; potential vorticity ; turbulent energy ; boundary conditions ; Eskman layers ; Geostrophic motion.

Models of wind-driven ocean circulation ; Homogeneous model ; Two and three-dimensional models of ocean currents.

Quasi-geostrophic motion of a stratified fluid on a sphere.

Instability theory. Baroclinic instability Eady's, Charney's and Phillips' models. Barotropic instability.

Ageostrophic motions, Continential shelf waves, Equatorial waves.

Atmospheric Turbulence and Diffusion.

Cyclones ; Anticyclones ; Theory of Monsoons.

Meteorology of Air Pollution.

Reference Books

1. J. Pedlosky, 1979—Geophysical Fluid Dynamics, Springer-Verlag, New York—Berlin-Heidelberg.

2. V. M. Kamenkovich, 1977—Fundamentals of Ocean Dynamics, Elsevier Scientific Publ. Co., Amsterdam-Oxford-New York (translated by R. Radok).

3. G. T. Csanady, 1973—Turbulent Diffusion in the Environment (Paper Back edn.), D. Reidel Publishing Co., Dordrecht-Holland, Boston-USA 1973.

4. G. T. Haltiner and F. W. Martin, 1957—Dynamical and Physical Meteorology, McGraw Hill & Co., New York, Toronto, London.

5. B. M. MacCormac, Ed. 1971, Introduction to the Scientific Study of Atmospheric Pollution, D. Reidel Publishing Co., Dordrecht, Holland.

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Regulation and Syllabus of the M. Phil Course in Life Science. The University of Calcutta

Candidates who have passed the Master of Science Examination in Botany, Zoology, Agriculture, Life Science, Physiology, Biochemistry, Anthropology with specialisation in Physical Anthropology and Physics with specialisation in Biophysics may be admitted to the M. Phil Course in Life Science.

Syllabus of the M. Phil Course in Life Science

COURSE NO. 1

Core Topics

Compulsory for all students coming from different disciplines

ENVIRONMENTAL BIOLOGY

(50 Marks)

1. Ecological factors and factorial interaction—water, soil, temperature, light, fire, oxygen and biotic factors. Adaptational physiology.

2. Concepts and dynamics of ecosystem, biogeochemical cycles. Ecoenergetics. Principles and strategy of survival in nature.

3. Productivity—primary and secondary aspects, man's use of productivity. Concept of systems analysis in ecology.

4. Brief outline of radio-ecology. Air, water, soil, light and sound pollutants and their control.

5. Conservation and resource management—natural resources in general, mineral resources, agriculture, forestry, wild life management, agriculture and land-use.

6. Human ecological aspects—variation and adaptation.

COURSE NO. 2

TOOLS & TECHNIQUES IN LIFE SCIENCE

(50 Marks)

(Any six to be chosen from the following items)

1. Theory and practice of tissue culture. 2. Bioassays. 3. Chromatography including GLC. 4. Microscopy and photomicrography. 5. Theory and practice of radio-biological methods. 6. Manometry. 7. Different types of centrifugation. 8. Electrophoresis. 9. Photometry. 10. Soil and water analysis. 11. Biochemical analysis —amino acids, carbohydrates, enzymes, etc. 12. Sero-genetics. 13. Biometrical analysis. 14. Growth analysis. Air sample analysis by GLC, AAS & IR.

COURSE NO. 3

Special Topic

(For students coming from Biochemistry and Biophysics sections)

Biological Sciences

CELL BIOLOGY AND GENETICS

(50 marks)

1. Gene expression and interaction, quantitative inheritance.
2. Chromosomes—euchromatin and heterochromatin, special types of chromosome.
3. Cellular and molecular basis of evolution.
4. Cell fusion and somatic hybridisation.
5. Extrachromosomal inheritance in eukaryotic system.
6. Applied human genetics.
7. Population genetics.
8. Practical applications of breeding principles with special emphasis on improvement of crops and farm animals.

PHYSIOLOGY

(50 Marks)

1. Physiology of growth and reproduction—plants, animals and man, hormones, pheromones, photoperiodism and vernalisation.
2. Ageing and senescence.
3. Biological rhythms and its significance.
4. Principles of ergonomics and biodynamics of human body.
5. Stress physiology.

COURSE NO. 3A

Special Topic

(For students coming from Botany, Zoology, Agriculture etc., Sections)

Biochemical and Biophysical sciences

MACROMOLECULES AND BIOLOGICAL MEMBRANES

(50 Marks)

1. Structure and functions of nucleic acids and proteins, protein isolations and purification, homogeneity determination. Methods of determination of molecular weights of macromolecules. Physico-chemical techniques for studying protein structure. Mechanisms of hormone and enzyme action.
2. Structure and functions of lipids and phospholipids. Membrane ultrastructure—molecular organisatien in biomembranes. Role of lipids and proteins in membrane structure. Physiochemical probes in membrane ultrastructure. Membrane functions—specific transport mechanisms.

BIOPHYSICS, ERGONOMICS AND STRESS PHYSIOLOGY

(50 Marks)

1. Equilibrium and thermodynamics in biochemical transformations.
2. Molecular biophysics of muscle action, electrical properties of nerve cell membrane, quantum nature and biochemistry of vision.
3. Principles of ergonomics and biodynamics of human body.
4. Stress physiology.

PART IV

Books and Journals on Environmental Science and Life Science available at Departmental Libraries of Calcutta University, Institutes and various Organizations at Calcutta*

Life Science Centre, Calcutta University,

35, Ballygunge Circular Road, Calcutta-700019

Phone : 47-3681

610 Arditte, J. and Dann, A. Experimental Plant Phsiology, Holt, Rineheart and Winston Inc., New York, 1968

614 Rao, K. L. India's Water Wealth, Orient Longman, Calcutta, 1975

616 Turk, A. and Wittes, J. T. Ecology, Pollution, Environment. W. B. Saunders Company, Philadelphia, London, 1972

617 Garvey, Gerald. Energy, Ecology, Economy. Macmillan, London, 1972

620 Mansfield, T. A. Effects of Air Pollution on Plants. Cambridge University Press, London, 1976

621 Agarwala, S. N. India's Population Problems. Tata Mc. Graw-Hill, New Delhi, 1977

624 Moore, Leonard. Encyclopedia of Nature, Hamlyn, London-N. Y., 1973

640 Southwick, C. M. Ecology and Quality of Environment. D. Van. N & S Co., N. Y., 1976

641 Ehrlich, P. R. Human Ecology Problems and Solutions. W. H. Freeman and Company, San Francisco, 1973

655 Das, T. M. Prithibi Ki Sudhu Manuser Janya ? Jonaki Publication, Calcutta, 1979

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* It is by no means a complete list, other books on these subjects are also available in the libraries.

657 Etherington, J. R. Environmental and Plant Ecology.
Wiley, New York, London, 1975

661 Lowenberg, Mirian. E. Food and man.
Wiley, New York, London, 1970

668 Agarwala, S. N. Population.
National Book Trust, India, 1967

680 Dombois, Mueller, etc.
Methods of Vegetation Ecology,
Wiley, New York, London, 1974

681 Hocker Jr., W. Harold.
Introduction to Forest Biology,
Wiley, New York, 1979

682 Hussell, H. and Staples, R. C.
Stress Physiology in Crop Plants.
Wiley, New York, London, 1979

683 Colinvaux, Paul A. Introduction to Ecology.
Wiley, New York, 1973

686 Kane and Strentiein. Life Science Physics.
Wiley, New York, 1978

692 Odum, Eugene, P. Ecology. Oxford & IBH,
New Delhi, 1978

693 Canuell, M. G. R. & Last F. T.
Tree Physiology and Field Improvement.
Academic Press, London, 1976

694 Bekele, N. etc. FAO Studies in Food and Population.
Oxford & FAO, 1976

696 Carrncross, J. An approach to Food/
Population Planning. Oxford & FAO, 1977

697 Brown, A. W. A. Ecology of Pesticides.
W. E. B. S., 1978

725 de Blij, H. J. The Earth. John Wiley & Sons, Inc.,
New York, 1980

726 Fellows Donald, Keith. Our Environment.
John Wiley & Sons, New York, 1980.

727 Strahler, A. N. and Strahler, A. M.
Modern Physical Geography.
John Wiley & Sons, South Barbara, 1978

728 Strahler, A. M. and Strahler, A. N.
Geography and Man's Environment.
John Wiley & Sons, New York, 1977

729 de Blij, H. J.
Human Geography Culture Society and Space.
John Wiley & Sons, New York, 1977

730 Tuve, G. L. Energy, Environment, Populations and Food.
John Wiley & Sons, New York, 1976

731 Koromondy, E. J. Concepts of Ecology.
Prentice Hall of India, New Delhi, 1978

732 Dasmann, R. F. and Freeman, M.
Ecological Principle for Economic Development.
John Wiley & Sons, London, 1973

734 1980 Year Book of Science and Future.
Encyclopedia Britanica Inc., London, 1979

735 1981 Year Book of Science and Future.
Encyclopedia Britanica Inc. 1980

740 Ehrlich, P. R. and Ehrlich, A.
Population, Resources, Environment,
W. H. Freeman & Company,
San Francisco, 1972

756 Kendligh, C. S. Ecology with special references to animals and man,
Prentice Hall of India, New Delhi, 1980

757 Patel, B. Management of Environment,
Wiley Eastern Limited, India, 1980

758 Winten, E. J. Water soil and the plant,
Macmillan, London, 1978

773 Rao, S.W.V.B. Bacterial Fertilizers. I.C.A.R., 1981

774 Torrie, A. Illustrated Glossary of Environmental and Ecological Terms.
Heinemann Educational Books, 1979

775 Ricklets, E. R. The Economy of Nature.
Chiron Press, Oregon, 1976

777 Marvels and Mysteries of the World around us,
Reader's Digest Association, Inc., New York, 1977

778 Macqueen, Jeen and Mares. T. The Living World.
Prentice Hall of India, 1981

759 Melvyn Howe, G. and Loraine, J. A.
Environmental Medicine,
William Heinemann Medical Books, London Ltd., 1980

760 Krebs, C. J. Ecology. The Experimental Analysis of
distribution and abundance,
Harper and Row, New York, 1978

761 Forey, P. L. The Evolving Biosphere,
Cambridge University Press, 1981

762 Lockwood, A. P. M.
Effects of Pollutants on aquatic organisms,
Cambridge University Press, London, 1976

769 Coombs, J. and Hall, D. O.,
Techniques in Bioproductivity and Photosynthesis,
Pergamon Press, 1982

779 Odum, E. P. Fundamentals of Ecology,
W. B. Saunders, N. Y., 1971

780 Andrews, W. A. Environmental Pollution,
Prentice Hall, New Jersey, 1972

781 Fitter, A. H. and Hay, R. K. M.
Environmental Physiology of Plants,
Academic Press, 1981

782 Adamson, R. G. Pollution and ecological approach,
Bell Haven House Limited, 1979

793 Das, T. M. Amar Gharer Ase-Pase,
Rupa, Calcutta, 1976

Journal

Nature—Macmillan Journals Ltd. (By Air Mail)

College of Agriculture, Calcutta University

35, Ballygunge Circular Road, Calcutta-700019

Phone : 47-3681

631.4 Hudson, Norman. Soil Conservation,
B.T. Batsford, 1971

628.16 American Water Works Association, Water treatment plant design, prepared by ASE, AWWA & CSSE
N.Y. AWWA, 1971

628.16 James, A. & Evison, L. eds.
Biological indicators of water quality.
New York, John Wiley, 1979

628.1684 Hopson, P. N. and Roberston, A. M.
Waste Treatment in Agriculture,
London : Applied Science Publishers, 1977

628.5 Loehr, Raymond C. Agricultural Waste Management,
Problem, processes and approaches,
New York, Academic Press, 1974

628.5 Loehr, Raymond C. Pollution Control for Agriculture,
New York, Academic Press, 1974

628.5 Toribera T.Y.S. and ors, eds.
Environmental pollutant, detection and measurement,
New York, Plennir Press, 1978

581.5 Ashby Maurice. Introduction to Plant Ecology.

581.5 Curtis J. J. Plant Ecology work book.
Veued Mince, Burges Publication, 1959

581.5 Gates, F. C. Field manual of Plant ecology.
N. J. Mc Craw-Hill, 1949

581.5 Greig, Smith P. Quantitative plant ecology.
Land, Butle, Worths, Publication, 1957

581.5 Hudson, J. P. ed. Control of the plant environment.
Land Butterworths scientific publication, 1957

581.5 Kormondy, E. P. Concepts of ecology, 1971

581.5 Krebs, C. J. Ecology : The experimental analysis of distribution and abundance.
New York, Harper & Row, 1972

581.5 Leach, W. Plant ecology. Mathnan etc. 1956

581.5 Levitt, J.
Responses of plants to environmental stresses,
New York, Academic Press, 1972

581.5 Mani, M. S.
Ecology and phytogeography of high altitude plants of the North West Himalaya, introduction to high altitude botany. New Delhi, Oxford, 1978

581.5 Shukla, R. S. and Chandal P. S.
Plant ecology, 3rd ed. New Delhi, S. Chand, 1977

581.5222 Etheruington, John R.
Environment and plant ecology
New Delhi, Wiley—Eastern, 1976

581.5222 Klage, H. W. Ecological Crop geography.
New York, Macmillans, 1942

Journals

Indian Journal of Plant Physiology, Indian Association of Plant Physiology, Divn. of Pl. Physiology, IARI, New Delhi-12

Indian Biologist,
Indian Association of Biological Sciences

Indian Agriculturist

Indian Journal of Soil Science

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572 Honingman, J. J. (ed).
Hand book of Social and Cultural Anthropology,
Rand McNally, Chicago, 1973

572 Kroelser, A. L. (ed). Anthropology Today, University of Chicago Press, Chicago, 1953

Boughey, A. S. Man and the Environment (2nd ed.), Macmillan, New York, 1975

Colinvaux, P. Introduction to Ecology, John Wiley & Sons, 1966

Gowell, Thomas Y. Culture, Man and Nature, New York, 1971

301.3 Hardesty, D. L. Ecological Anthropology, John Wiley & Sons, New York, 1977

301.36 Howley, A. Ecology and Populations, *Science*, 179 : 1196-1201, 1973

301.3 James, A. Quinn. Human Ecology, New York, 1950

Kormondy, E. J. Concepts of Ecology, Prentice Hall, Englewood, Cliffs, N. J., 1969

Moriber, G. Environmental Science, Allyn and Bacon, Inc. Boston, 1977

Oduen, E. P. Fundamentals of Ecology, 3rd edition, W. Saunders, Philadelphia, 1971

Sapir, E. Language and Environment, *American Anthropologist*, 14 : 226-42, 1912

301.3 Smith, R. L. (ed). The Ecology of Man, Harper and Row, New York, 1972

Phillip, W. Porter. Environmental Potentials and Economic opportunities—A background for cultural adaptations, *American Anthropologist*, Vol. 67 : 409

Environment, Culture and Personality, *American Anthropologist*, Vol. 461, 47 : 262, 46 : 1

Environment and Education, *American Anthropologist*, Vol. 44 : 712

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613.1 Dallavalle, J. M. Industrial environment and its control, Sir Issac Pitman and Sons Ltd., London, 1948

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Department of Biochemistry, Calcutta University

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576.15 Alexander M. ed. Advances in microbial ecology, New York : Plenum Press, 1977

616.5 Marzulli F. N. & Maibach H. I. ed. Advances in modern toxicology, Washington : Hemisphere Pub. Co. 1977

615.323 Altschul, Sirivon Reis. Drugs and foods from little known plants, Cambridge, Harvard University, 1975

632.6 Ivie, G. Wayne & Dorough, H. W. ed. Fate of Pesticides in large animals, New York, Academic Press, 1977

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301.243 Baer, Adela S. ed. Heredity and Society, readings in Social, 2nd ed. genetics New York, Macmillan Publishing Co. 1977

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The soil factor in nutrition, animal & human.
New York, Marcell Dekker, 1976

581.8761 Beevers, Leonard.
Nitrogen metabolism in Plants,
London, Edward Arnold, 1976

581.152 Bhatia, Balraj & Ors, eds.
Selected topics in environmental biology.
New Delhi, Interprint Publications, 1975

612.3 Kallen, D. J. ed.
Nutrition-Developmental & Social Behaviour,
U.S. Dept. of Health, Education & Welfare

5714.5263 Lockwood, A.P.M.
Effects of Pollutants on Aquatic Organisms,
Cambridge, Cambridge University Press, 1976

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575 Shvarts, S. S.
The Evolutionary ecology of animals,
New York, Consultants bureau, 1977

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New York, Marcd Dekker, 1975

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Mutagenic effects of environmental Contaminants.
N. Y. Academic Press, 1972

540 Turekian, Karl, K. Chemistry of the Earth.
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37, S. P. Mukherjee Road, Calcutta-700026

Phone : 47-3045

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Institute of Basic Medical Sciences

244, A. J. Bose Road, Calcutta-700020

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Jadavpur University (Food Technology and Biochemical Engineering Department)

Raja S. C. Mullick Road, Calcutta-700032

Phone : 72-4044

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PART V

*Science Clubs in the Eastern Indian States**

Assam

1. Students' Science Society,
   K. R. C. Road, Gauhati-781009

Bihar

1. Rohini Science Club, Kokra, Ranchi-834001
2. Youth Science Club, Ranchi

Mizoram

1. Science Club, C/o V. H. L. Sailo,
   Directorate of C. D. Mizoram, Aizawl
2. Republic High School Science Club,
   C/o N. L. Chanda. Aizawl

Manipur

1. Science Club, Manipur, C/o N. Tomba Singh,
   Thombal, 795138, Athokpam, Awangbikai

Orissa

1. Parija Science Club, C/o Abhiram Kr. Dash,
   At. Telengnsathi, P.O. & Dt. Balasore-756001

Tripura

1. Kishore Bighan Chakra, Ramnagar Road No. 3,
   Agartala, West Tripura-799002

West Bengal (District wise)

Bankura

1. Bankura Science Club, Bankura Block Yuba Kendra,
   Pratapbagan

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2. Bankura Block I Science Club,
C/o Bankura Zilla School, P.O. Bankura

3. Bankura Block II Science Club,
C/o Purandarpur High School, P.O. Bankura

4. Bankura Science and Technological Club,
P.O. Durlavpur

5. Bankura Students' Science Centre, Barakalitala,
P.O. Bankura

6. Barjora Block Yuba Kendra Science Club,
C/o Beliatore High School, P.O. Barjora

7. Beliatore Science Club, C/o Beliatore High School,
P.O. Beliatore

8. Khatra Science Club, P.O. & Vill.—Khatra

9. Purandarpur Science Club,
C/o Purandarpur High School,
P.O. & Vill—Purandarpur

10. Ramharipur Ramkrishna Mission Science Club,
P.O. Ramharipur

11. Saltora Block Bigyan Parishad,
C/o Dr. Bidhan Chandra Vidyapith, P.O. Saltora

Birbhum

12. Bolpur Sriniketan Block Science Club,
C/o Bandhgora Kalikrishna Vidyalaya
P.O. Bolpur

13. Dubrajpur Block Science Club, C/o S. S. Vidyapith,
P.O. & Vill—Dubrajpur

14. Illumbazar Block Science Club,
C/o Hansra High School, P.O. Hansra,
(Via Sriniketan) Dist. Birbhum

Burdwan

15. Science Club, C/o Utpal Bhattacharjee,
Charaktala, P.O. Katwa

16. Youth Cultural Forum, Kachhari Road, P.O. Katwa

17. Amra Kajan Science Club, Street No. 84,
Qrt. No. 46/A, P.O. Chittaranjan-713331

18. Bijnan Parishad, College Para, P.O. Katwa

19. Burdwan Newton Science Club,
17, Nalinaksha Bose Road, P.O. Burdwan

20. Durgapur Science Club, C/o E/10, New Colony,
D.T.P.S. (D.V.C.) Waria, Durgapur-713207

21. Kalna Block I Science Club, C/o Block Youth Officer,
Bhaduripara, Kalna

22. Kalna Block II Bijnan Parishad, Baidyapur,
P.O. Baidyapur

Coochbehar

23. Oasis Science Club, C/o Sri Dinesh Chandra Pal,
P.O. Tufanganj-736159

24. Tufanganj Science Club, C/o Popular Radio Service,
P.O. Tufanganj-736159

Calcutta

25. Acharya Prafulla Chandra Roy Silpa O Bijnan Bhavan,
11B, Shyama Prasad Mukherjee Road, Calcutta-25

26. Acharya Satyen Basu Bijnan Sansad,
3, Sarsuna Main Road, Calcutta-61

27. Advanced Institute for Scientific Invention,
87/5, Raja S. C. Mullick Road, Calcutta-47

28. Anagh Modelling Centre, 7/29, Podder Nagar,
P.O. Jodhpur Park, Calcutta-68

29. Anusandhani Bijnan Sangha,
C27, East Rajapur, Calcutta-32

30. Anwesha Science Organisation,
14D, N. N. Ghosh Lane, Calcutta-40

31. Annway, 4/30, Bejoy Garh, Calcutta-32

32. Bangiya Bijnan Parishad (Hate Kalame Bivagh),
P23, Raja Rajkrishna Street, Calcutta-6

33. Behala Govt. Qrts. Recreation Club (Sc. Group),
48/304, Parnasree Central Govt. Qrts. Calcutta-60

34. Sagnik Bijnan Sanstha, West Barisha Housing Estate,
Block—R-G, Flat—6, P.O. Thakurpukur, Calcutta-63

35. Banibhavan Science Club, C/o B. B. High School,
38B, Sree Colony, Calcutta-92

36. Baranagar Rabindra Manimela,
98/5, Gopal Lal Tagore Road, Calcutta-36

37. Calcutta Institute of Biology
Rupniketan, 2/61, Sree Colony, Calcutta-47

38. Cosmic Science Club, L.I.C. Quarters,
Flat No. 26, Unique Park, Calcutta-60

39. Creative Ability Centre,
C/o Birla Industrial and Technological Museum,
19A, Gurusaday Road, Calcutta-19

40. East End Park Science Forum, P-12, Eastend Park,
P.O. Kalikapur B. O., Calcutta-78

41. Eastern India Science Club Association,
13, Regent Estate, Calcutta-92

42. Friends Scientific Club, 412D/3, Netaji Subhas Road,
Calcutta-47

43. Galaxy, C/o Tapas Banerjee,
20/4/1A, Brindaban Basak Street, Calcutta-5

44. Hindu School Science Centre,
1B, Bankim Chatterjee Street, Calcutta-73

45. Institute of Electronics and Audiovisual Science,
3, Park North, Santoshpur, Calcutta-75

46. Institute of Science and Technological Research,
30, Babubagan Lane, Calcutta-31

47. Jadavpur Science Association,
Rupniketan, Sree Colony, Calcutta-47

48. Jadavpur University Science Club,
C/o Jadavpur University, Calcutta-32

49. Jagadish Chandra Bose Science Club,
C/o N. N. Chaudhri, 8, Telipara Lane,
Dhakuria, Calcutta-31

50. Jadavpur Bijnan Chakra, A/10/A Ramkrishna
Upanibesh, P.O. Jadavpur, Calcutta-32

51. Association of the Society for the Study of Man and
Nature, 25, Russa Road (south), 1st Lane,
Calcutta-33

52. Kishore Kalyan Parishad,
22, Tagore Castle Street, Calcutta-6

53. Little Star Science Club,
14D, N. N. Ghosh Lane, Calcutta-40

54. Pushpak Science Club,
15, Kali Kumar Banerjee Lane, Calcutta-2

55. Prince Young Science Club,
188/25A, Prince Anwar Shah Road, Calcutta-45

56. Science Association of Baranagar,
C. P. Estate, Qtr. No. N/28, Calcutta-56

57. Science Association of Bengal,
104, Diamond Harbour Road, Calcutta-8

58. Science Club of Barisha,
6, Sashi Bhusan Banerjee Road, Calcutta-8

59. Shalik, Tulshibagan, Birati, Calcutta-51

60. Science for Children, Rabindra Sarobar Stadium,
Block VA, Room No. 8, Calcutta-19

61. Science Forum, C/o Tirthapati Institution,
142/1, Rash Behari Avenue, Calcutta-29

62. Sabitari Betar Bijnan Club, C/o Ashim Chakrabarti,
173, Ashokegarh, Calcutta-35

63. Seminal Science Association,
127, Maharaja Nanda Kumar Road (North), Cal.-35

64. South Calcutta Science Circle,
4, K. K. Majumdar Road, Santoshpur, Calcutta-75

65. Sri Gopal Chandra Bhattacharyya,
Bigyan Prasar Samity, 18A, Gouribari Lane, Cal.-4

66. Students' Model Making Society,
CF-287, Salt Lake City, Calcutta-64

67. Students' Science Association,
66, Mahesh Barik Lane, Calcutta-11

68. Modern Science and Rural Development Institute,
3/84 Viveknagar, Calcutta-75

69. Youth Science Corner,
19/2B Selimpur Road, Cal.-13

70. Youth Scientist Association,
8, Narendranegar, Calcutta-56

71. Yubak Sangha Science Club, C/o Rabindra Palli,
P. O. Garia, Calcutta-47

72. Students' Model Making Society,
50/1 South Road, Calcutta-75

73. Modellar, C/o Abhijit Kabiraj,
216/A, Bidhan Sarani, Calcutta-6

74. Jawhar Shishu Bhaban (Science hobby centre),
94/1, Chowringhee Road, Calcutta-20

75. Indian Assoc. of College Going Scientist,
1, Bompass Road, Calcutta-17

76. Dum Dum Bijnan Sangha,
P45A, Motijheel Avenue, Calcutta-28

77. Sontoshpur Cultural Forum,
20, Lake East 6th Road, Calcutta-75

78. Sugata Roy Memorial Centre for Chemistry,
533, Jodhpur Park, Calcutta-68

79. Sky Watchers' Association,
134, Raja Rajendralal Mitra Road, Room-7,
Calcutta-55

80. Students' Science Organisation,
8, Telipara Road, Calcutta-25

81. Vijnan Prasar Samity, C/o Jagadbandhu Institution,
25, Fern Road, Calcutta-19

82. Young Scientists' Association,
11, B. T. Road, Calcutta-56

83. Yuger Sathi, 22/3/1, Canal West Road, Calcutta-6

Howrah

84. Acharya P. C. Roy Science Club,
Palpara Govindrajew High School, Dhulasimla

85. Acharya Satyen Bose Bijnan Samiti,
C/o Bantul Mahakali High School, P.O. Bantul

86. Antoral Bijyan Gosthi,
1, Abinash Banerjee Lane, Shibpur

87. Acharya P. C. Roy Bijnan Samity, Anandaniketan,
P.O. Bagnan

88. Bijnan Tirtha, 1, Jora Aswatthatala Lane,
P.O. Bally-711201

89. Blue Star Science & Cultural Association,
P.O. Bagnan, Vill. Khalore

90. Creature, 14/1/6, Sitanath Bose Lane,
Salkia-711106

91. Dr. Anil Das Smriti Science Club,
C/o Bangalur, U. C. High School, P.O. Bangalur

92. Howrah Bijnan Parishad, 23, Shibpur Road-711102

93. Howrah Science Association,
280/1, Netaji Subhas Road-711001

94. Joynagar Pallisree Vidyaniketan Science Club,
C/o Joynagar Pallisree Vidyaniketan,
Vill. & P.O. Joynagar

95. Nabarun Sahitya Gosthi (Sc. Wing),
1/39, Nischinda Ghoshpara, Bally-711201

96. North Howrah Science Association,
74, Sitanath Bose Lane, Salkia-711106

97. Saraswati Club, 15, Kailash Banerjee Lane-701101

98. Scientific Society of Students',
Charu Chandra Pal Road, P.O. Jhorehat-711302

99. Shibpur Science Forum, 96, Shibpur Road-711002

100. Sarbik Gram Bikash Kendra, C/o Gopal Ghosh,
Harop, Bangalur

101. Sri Hari Vidyamandir Science Club,
C/o Sri Hari Vidyamandir. P.O. Pancharul

102. Nabatirtha Science Centre, Khalore, Bagnan,
Pin-711303

103. Howrah Bijnan Jagat, 312/1, Circular Road,
Howrah-2

104. Bagnan Bijnan O Sanskritik Sanstha,
Khalore, Bagnan

105. Ramendra Sundar Bijnan Chakra,
C/o Dharsi Mihiral Khaln Institution, P.O. Dharsi

106. Udaynarayanpur Bijnan Parishad,
C/o Sarada Charan Institute, P.O. Udaynarayanpur

Hooghly

107. Arunodaya Club, 47, Pandit Kalinath Bhattacharyya
Lane, P.O. Serampore

108. Bijnan O Sanskriti Pratisthan,
3, Gobindo Chandra Bhattacherjee Lane,
P.O. Serampore,—712201

109. Carey Hobby Centre, C/o Serampore College,
Serampore

110. Chandernagore Planetarium, Charmandirtola,
P.O. Gandalpara, Chandernagore

111. Chandernagore Science Club, P.O. Chandernagore

112. Chinsura Science Club, Shambabu's Ghat Lane, P.O. Chinsura

113. Creative Cultural Centre, C/o Kanailal Vidyamandir, P.O. Chandernagore

114. Dankuni Vaishali Bijnan Sangstha, P.O. Dankuni

115. Hooghly District Science Club, Badpur, P.O. Akuni, Via—Masat

116. Serampore Science Club, 43, Duttapara Lane, Chatra, P.O. Serampore

117. Garalgacha Science Club, P.O. & Vill. Garalgacha

118. Konnagar Science Club, 31, R. C. Ghoshal Lane, P. O. Konnagar

119. Nabagram Science Club, 7, Shyama Prosad Road, P.O. Nabagram

120. Pioneers' Group, 1, Sarat Chatterjee Road, Nabagram

121. Satyen Bose Bijnan Samity, C/o Ramnagar N.B.P.C. High School, P.O. & Vill. Ramnagar

122. Serampore Bijnan Parishad, 13, Chatterjee Lane, P.O. Serampore

123. Singur Science Club, P.O. Singur

124. Youth Hostel Association, 2AS, Rishra Rail Park, P.O. Rishra

125. Youth Science Corner, C/o A. Bhattacharyya, P.O. Barabahero, Konnagar

Jalpaiguri

126. Hasimara Science Club, C/o Hasimara High School, P.O. Hasimara

127. Nabajiban Sangha Science Club, Dhupguri

128. Madarihat Science Club, C/o Babul Mitra, P.O. Madarihat

129. Sandhani Bijnan Chakra, P.O. Banarhat, Pin-735205

130. Salsalabari Model High School Science Club, C/o S. Saha, P.O. Salsalabari, 736208

131. Sonapur B. K. High School Science Club, P.O. Sonapur

132. Matribani Science Club, C/o Pradip Basak, P.O. Dhupguri (Nutanpara), Pin-735210

Malda

133. Einstein Memorial Science Club, C/o Ramkinkar Balika Vidyasram, 2, Govt. Colony, P.O. Malda

134. Jnanpith Science Club, House of Sri S. Nandi, Kutubpur, Nayagram Road, 732101

135. Bijnanananda Science Club, C/o Vivekananda Vidyamandir, P.O. Malda

136. Nebula Science Club, Via Singatala, (Near Fire Brigade), P.O. Malda, 732101

Murshidabad

137. Babta Netaji High School Science Club, Babta

138. Berhampore Block Science Club, C/o Berhampore Block Yuba Kendra, P.O. Khagra

139. Berhampore Science Club, Purbachal Road, P.O. Khagra

140. Manindranagar Girls' High School Science Club, C/o Manindranagar Girls' High School, Cossimbazar

141. Murshidabad Zilla Bijnan Parishad, 11/3A, K. K. Banerjee Rd., P.O. Berhampore-742101

142. Miatali Milanayan, P.O. Chak Islampur

143. Raja Bijoy Singh Vidyamandir Science Club,
C/o Raja Bijoy Singh Vidyamandir, Jiaganj

144. Raghunath Science Cultural Centre,
P.O. Raghunath Gunj

145. Murshidabad Science Club, (Sc. & Cult. Organization)
Jubilee Tank (Lal bagh), P.O. Murshidabad-742149

Midnapore

146. Acharyya Jagadish Chandra Bose Science Club,
C/o Prof. Jogen Debnath, Rabindranagar-721101

147. Acharyya P. C. Roy Science Club,
Sabang Saradamoyee High School, P.O. Sabang

148. Bijnan Anushilan Kendra,
C/o Daspur-1, Block Youth Office, P.O. Daspur

149. Binpur I Block Science Club,
Lalgarh Ramkrishna Vidyalaya, P.O. Lalgarh

150. Bijnan Anushilan Kendra, C/o Sagarpur Sri Ashutosh
H. S. School, P.O. Sagarpur, Vill. Dashpur

751. Contai Science Club, C/o Contai High School,
P.O. Contai-721401

152. Egra Science Club, P.O. Kasba, Egra

153. Jagadish Chandra Bose Science Club,
Naikuri Thakurdas Institute,
P.O. & Vill. Naikuri

154. Hamilton Science Club, C/o Hamilton High School,
P.O. Tamluk

155. Kolaghat Science Hobby Centre, P.O. Kolaghat

156. Joutha Sanskritiki, C/o Steel Builders, P.O. Tamluk

157. Lalgarh Students' Science Club,
C/o Lalgarh Ramkrishna Vidyalaya, Binpur

158. Little Scientists' Culture, P.O. Kolaghat,
Vill. Parkpara

159. Nabarun Sangha, C/o Subrata Chakrabarti,
Vill. Ashurali, P.O. Kolaghat

160. Panna Bharat Ratna Roy Science Club,
P.O. & Vill. Panna

161. Photon Science Centre, C/o Subrata Ghorai,
P.O. Panskura

162. Prafulla Smriti Bijnan Sanstha,
C/o Block Yuba Kendra,
Saltora-2, P.O. Chakdwipa

163. Popular Science Hobby Centre,
C/o Aurobindo Siksha Niketan,
P.O. Chakshyampore-721124

164. Satyen Bose Bijnan Sangstha, Block Yuba Kendra
Panskura-II, P.O. Kolaghat

165. S. N. Bose Science Club, P.O. Deulia

166. Science Club of Block Yuba Kendra, Egra-1

166. The Midnapore Science Society, P.O. Basantitala

168. Science Centre, Sahapur Moon Light Club,
Vill. Sahapur, P.O. Kolaghat

Nadia

169. Chakdaha Block Science Club,
C/o Chakdaha Block Yuba Kendra, Chakdaha

170. Kanchrapara Science Club, P.O. Kataganj

171. Nabadwip Block Science Centre,
C/o Nabadwip Jatiya Vidyalaya, Nabadwip

172. Taherpur Bijnan Parishad, C/o Air Voice,
P.O. Taherpur

173. Khalboalia High School (Science Club),
P.O. Khalboalia

174. Soumen Majumdar Samaj Bijnan Institute,
P.O. Chakda

175. Ranaghat Bijnan Samiti, C/o College Staff Qrts. P.O. Ranaghat

176. Tarun Sansad Samaj Bijnan Anusilan Kendra, P.O. Madanpur

177. Fulia Science Club, P.O. Fulia Colony-742402

178. Chakda Gano Bijnan Kendra, P.O. Chakda

179. Ranaghat Samaj Bijnan Parishad, P.O. Ranaghat

180. Chakda Bijnan Parishad, P.O. Chakda

181. Children Association for Science & Technology, P.O. Krishnanagar-741101

182. B. P. C. Jr. Tech. Science Club, P.O. Krishnanagar-741101

183. Bijnan O Sahitya Chakra, P.O. Shantipur-741404

184. Majdhia Bijnan Club, P.O. Majhdia

185. Shantipur Science Club, P.O. Shantipur-741404

186. Kalyani Science Club, B10/102, P.O. Kalyani

Purulia

187. Jhalda Science Club, C/o Jhalda Satyabhama Vidyapith, P.O. Masina

188. Sri Bhaskaracharyya Bijnan Club, C/o Balarampur Phoolchand High School, Debiprasad Banerjee Road, Balarampur, P.O. Rangdih

West Dinajpur

189. Kaliyaganj Bijnan Charcha Kendra, C/o Satyapriya Roy Kendriya Granthagar, P.O. Kaliyaganj, Pin-733129

24 Parganas

190. Alpha Science Club, 1, Ganendra Deb Road, Majilpur, P.O. Jaynagar

191. Anneswa, P.O. Maslandapur, Pin-743289

192. Asokenagar Bijnan Sangstha, 686/1, Asokenagar, P.O. Asokenagar, Pin-743222

193. Banitirtha Bijnan Chakra, Diamond Harbour

194. Barasat Bijnan Sangha, C/o Shyamal Gon Sivanda Palli, P.O. Barasat

195. Bijnan Sansad, Vill. Bishnupur, P.O. Rajarhat, Bishnupur

196. Baruipur Science Club, P.O. Baruipur

197. Basirhat Agro-technical Organisation, C/o Prof. Narayan Das, Basirhat College, P.O. Basirhat College

198. C. V. Raman Bijnan Sadan, Vill. & P.O. Helencha Colony

199. Bijnan Darbar, 100, Basantababu Road, P.O. Kanchrapara-743145

200. Gaighata Block Science Club, C/o Dhakuria High School, Chandpara Bazar

201. Jogananda Bijnan Sadan, P.O. Khulna, Via Sandesh Khali

202. Gobardanga Renaissance Institute, P.O. Khantura

203. Guma Science Circle, Vill. Prithiba, P.O. Guma

204. J. S. Association, Vill. Patuli, P.O. Garia

205. Kalinagarhat High School Science Club, P.O. Kalinagarhat, Via Nazat

206. Maheshtola Bijnan O Sanskriti Parishad, P.O. & Vill. Durlavpur, Muheshtola, Pin-743352

207. Media Bijnan Asar, C/o Chhatra Kalyan Samity, P.O. Media (Via Khantura)

208. Progressive Science Club, 202/2, Ashokenagar, P.O. Ashokenagar